SOUND DEVICES

PRELIMINARY

688

Field Production Mixer with
Integrated Recorder and MixAssist™

User's Guide

Legal Notices

Product specifications and features are subject to change without prior notification.

Manual Conventions

Symbol	Description
>	This symbol is used to show the order in which you select menu commands and sub-options, such as: Main Menu > Audio indicates you press the Menu button for the Main Menu, then scroll to and select Audio by pushing the Control Knob.
+	A plus sign is used to show button or keystroke combinations. For instance, ALT+MENU means to hold the ALT button down as you press the MENU button. Ctrl+V means to hold the Control key down and press the V key simultaneously.
ⓘ	A note provides recommendations and important related information. The text for notes also appears in a different color and italicized.
⚠	A cautionary warning about a specific action that could cause harm to you, the device, or cause you to lose data. Follow the guidelines in this document or on the unit itself when handling electrical equipment. The text for cautionary notes also appears in a different color, bold and italicized.

688 User's Guide • Rev 1-A •
March 4, 2015 11:10 AM

This document is distributed by Sound Devices, LLC in online electronic (PDF) format only, but may be purchased in printed form. E-published &/or printed in the USA.

www.sounddevices.com

support@sounddevices.com

Sound Devices, LLC
E7556 Road 23 and 33
Reedsburg, Wisconsin USA

Direct: +1 (608) 524-0625
Toll Free: (800) 505-0625
Fax: +1 (608) 524-0655

Revision History

This table provides the revision history of this guide and includes notes for what changes were made.

Rev#	Date	Firmware Version	Description
1-A	March 2015	v1.00	Initial Publication

Overview of Chassis

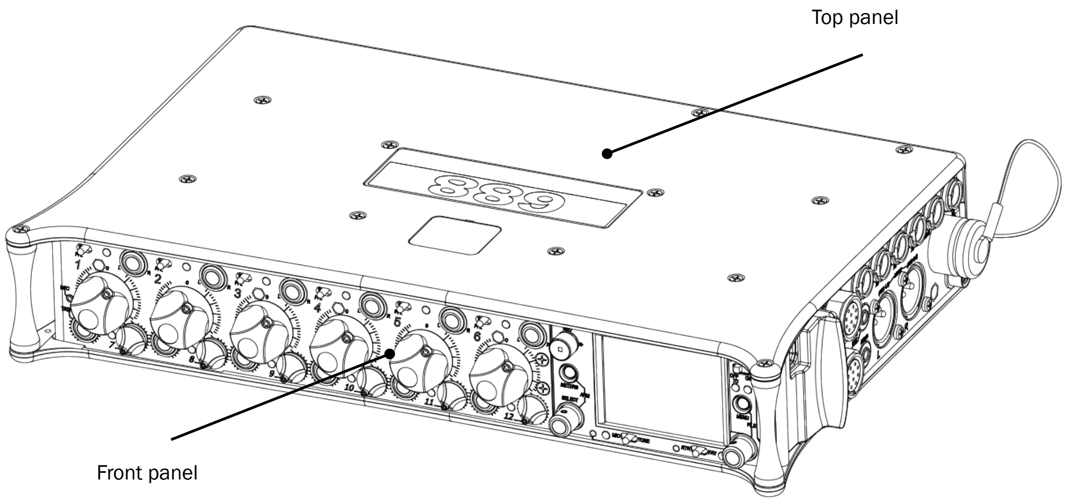
The 688 chassis is made of light-weight and durable carbon-fiber.

The front panel of the chassis features several easy-to-reach controls, switches, LEDs, and a sunlight-visible LCD screen.

Its side panels provide a variety of connection options for ultimate I/O flexibility. The top and bottom panels offer additional connectors that allow for expansion with optional accessories, such as the SL-6 (on the top only) or the CL-6 (on the bottom only).

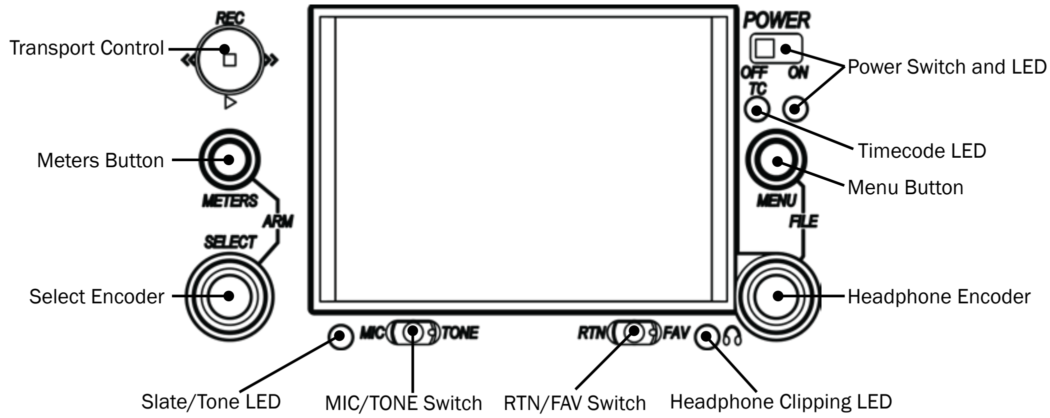
Topics in this section include:

Front, Top, and Bottom Panels



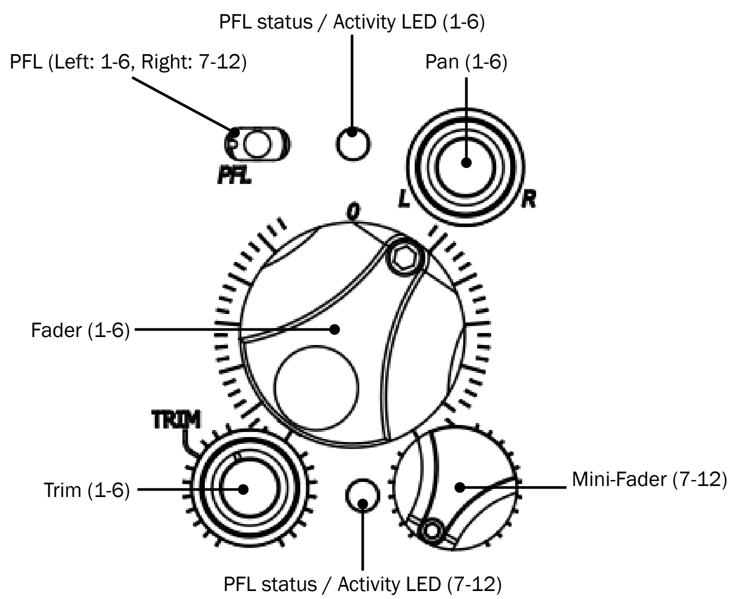
The top panel of the chassis features the SL-6 multi-pin header connector used with the optional SL-6 accessory. Similar to the top panel, the bottom panel (not shown) features the CL-6 multi-pin header connector used with the optional CL-6 accessory. Both connectors are located under removable protective covers.

The front panel provides the LCD as well as several buttons, switches, and controls as defined in the following tables.



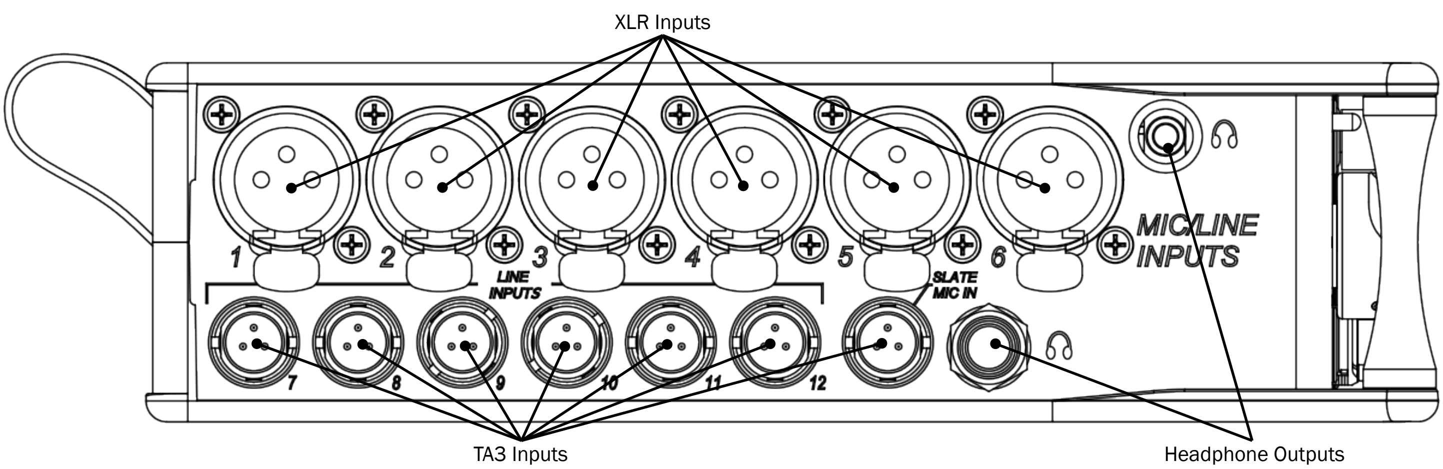
Feature	Description
Power Switch and LED	Powers 688 on and off, and indicates power status.
Timecode LED	Flashes blue to indicate whether the internal timecode generator (and QuickBoot) is active while the mixer is off.
Menu Button	Provides access to the Main menu. Used for various shortcut functions.
Headphone Encoder	Adjusts headphone level and monitor source. Used for various shortcut functions.
Headphone Clipping LED	Illuminates red to indicate headphone output is approaching clipping level.
RTN/FAV Switch	Toggles monitor source. Can be customized or disabled in the Main menu (Comms/Returns). Used for various shortcut functions.
MIC/TONE Switch	Toggle slate mic and tone generator. Can be customized or disabled in the Main menu (Comms/Returns). Used for various shortcut functions.
Slate/Tone LED	Indicates slate mic is active or tone generator is locked on.
Select Encoder	Multiple purpose rotary encoder. Used for various shortcut functions.
Meters Button	Cycles between meter views. Used for various shortcut functions.
Transport Control	Controls playback and recording. Used for various shortcut functions.

Also on the front panel, there are six sets of controls related to inputs, such as pans, faders, and trims.



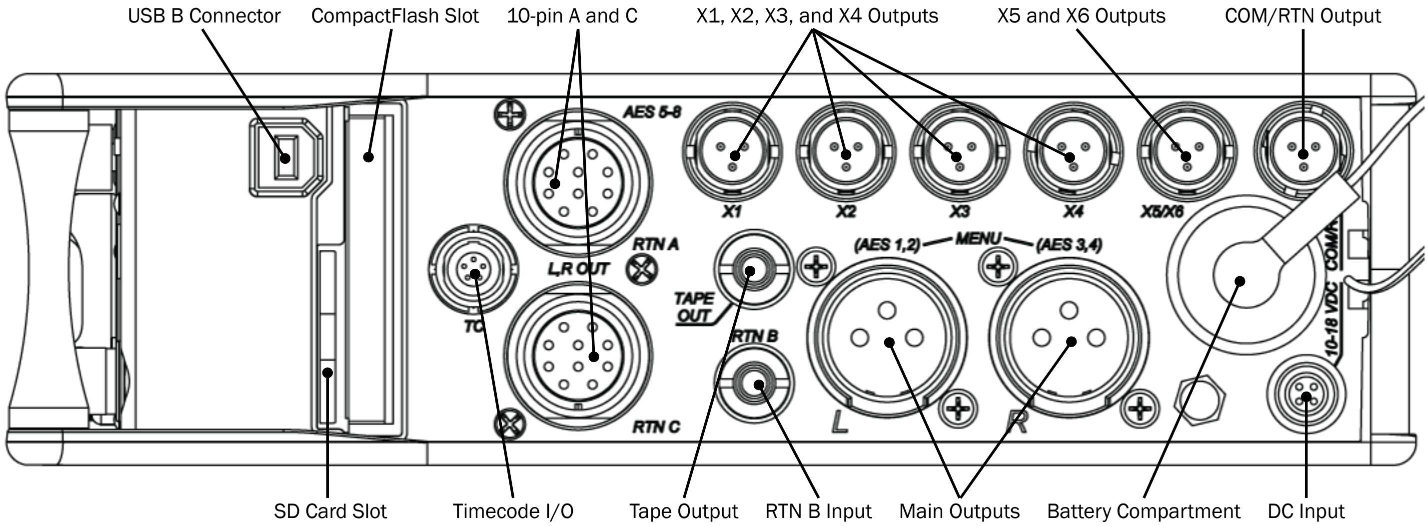
Feature	Description
PFL Switch	By default, this switch has dual-functionality. It activates Pre-Fade Listen (PFL) and displays Input Settings screen for input 1-6 (slide left) and 7-12 (slide right). Slide again to deactivate. The functionality of this switch may be altered via the Main menu's Inputs > PFL Toggle Mode. Does not affect Master Output signal. For momentary action, hold the switch for one second or longer. The input LED flashes yellow when an input's PFL is active. ⓘ *Because the CL-6 accessory provides separate PFL switches for inputs 7-12, when the CL-6 is attached to the 688, the dual-functionality of the six PFL switches on the 668 changes. Slide left activates PFL and slide right displays Input Settings for inputs 1-6 only.*
Fader (1-6)	Adjusts fader level for inputs 1-6.
Mini-Fader (7-12)	Adjusts fader level for inputs 7-12. ⓘ *When the CL-6 accessory is attached to the 688, the mini-faders become trim controls for inputs 7-12.*
Trim (1-6)	Adjusts trim level for inputs 1-6.
Pan (1-6)	Adjusts pan between L and R tracks.
PFL status / Activity LED (1-6)	Indicates PFL status and input signal activity.
PFL status / Activity LED (7-12)	Indicates PFL status and input signal activity.

Left Side Panel



Feature	Description
XLR Inputs	Active-balanced analog microphone- or line-level inputs. Inputs 1 and 6 can also accept AES3 or AES42 (Mode 1) signal. Pin-1 = ground, pin-2 = hot (+), and pin-3 = cold (-).
TA3 Inputs	Active-balanced analog line-level inputs. Pin-1 = ground, pin-2 = hot (+), and pin-3 = cold (-).
Headphone Outputs	3.5mm and 1/4" headphone outputs. Can drive headphones from 8 to 1000 ohm impedances to very high levels. Tip = left, ring = right, and sleeve = ground.

Right Side Panel

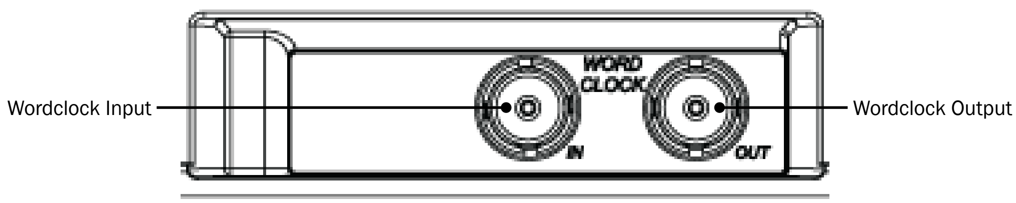


Feature	Description
USB B Connector	Factory use and keyboard connection (with adapter).
CompactFlash Slot	Accepts approved CompactFlash cards with the label-side toward the rear of the mixer. Compatible with Type I and Type II cards. High-speed UDMA cards are recommended for higher track count recording.
10-pin A and C	Each connection includes a pair of transformer-isolated Outputs and a stereo unbalanced Return input. Analog Output levels are selected between Line, -10, and Mic levels in Main menu OUTPUTS section. 10-pin A outputs can be set to AES Outputs 5,6 and 7,8 in Main menu OUTPUTS section.
X1, X2, X3, X4 Outputs	Line, -10, or Mic level selected in Main menu OUTPUTS section. (Pin 1 = Ground, pin 2 = Hot (+), pin 3 = Cold (-)) Float pin 3 to unbalance.
X5, X6 Output	Unbalanced stereo, tape level output on TA3 connector. (Pin 1 = Ground, pin 2 = Left, pin 3 = Right)
COM/RTN Input	Line-level input for return feed from on-set communications sources.
SD Card Slot	Accepts SD/SDHC/SDXC cards with the notched corner oriented toward the top of the 664. High speed class 10 cards are recommended. Insert until it clicks securely in the slot. The card should glide smoothly into the slot. Press to eject.
Timecode I/O	Time code input and output on 5-pin LEMO® connector.
Tape Output	Unbalanced stereo, tape level output on 3.5 mm connector. (Sleeve = Ground, Tip = Left, Ring = Right)
RTN B Input	Unbalanced stereo 3.5 mm female connector for Return B audio input. (Sleeve = Ground, Tip = Left, Ring = Right.)
Main Outputs	Transformer-balanced analog outputs on standard 3-pin XLR-3M connectors. Can be set to send AES3 digital signals (1,2 and 3,4 on L and R respectively) in Main menu OUTPUTS section. (Pin 1 = Ground; pin 2 = Hot (+); pin 3 = Cold (-)) Unbalance by grounding pin 3 to pin 1.

Feature	Description
Battery Compartment	Holds five AA (LR6) batteries for backup powering. NiMH rechargeable cells advised.
DC Input	Accepts DC voltages from 10–18 V for powering. (Pin 1 = Negative (–), pin 4 = Positive (+))

Back Panel

The back panel contains BNC wordclock connections:



Feature	Description
Wordclock Input	Accepts word clock rates between 44.1 kHz and 192 kHz for synchronizing the internal recorder to external digital audio devices.
Wordclock Output	Provides word clock signal to synchronize external digital audio devices

The LCD and User Interface

The LCD display is the primary source of information when operating the 688. All settings are configured via the LCD display. All signal level meters can be displayed on the LCD display.

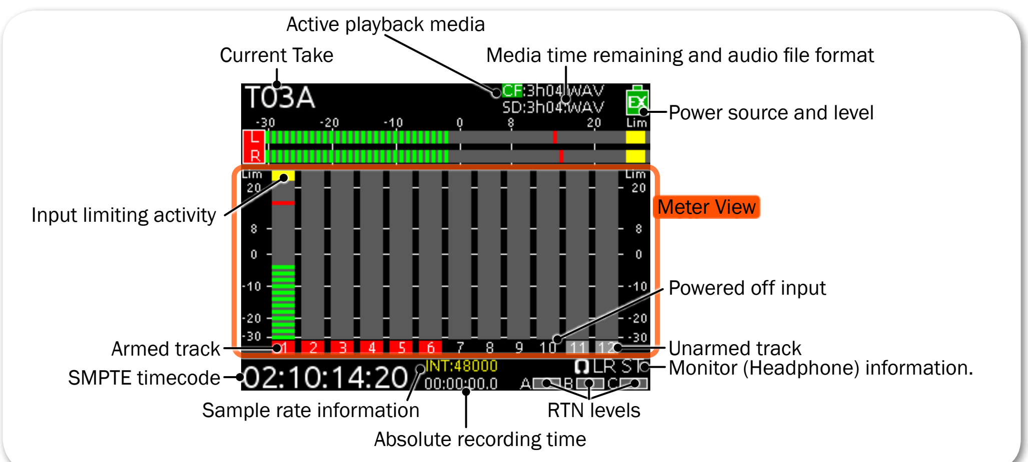
This chapter describes meter views, including the Main screen which is displayed when no other screens are active, the Main menu, and LCD Daylight mode.

Other screens are described where applicable throughout the guide.

Topics in this section include:

Meter Views

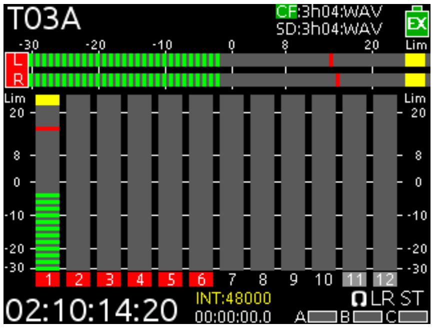
The 688 displays important metering information at a glance on its LCD. All meter views provide various combinations of input, track, and return meters. By default, the first of three predefined meter views is shown. This view is known as the Main screen.

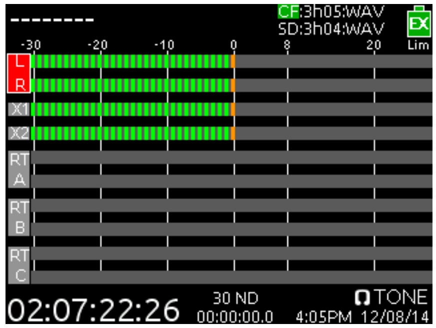


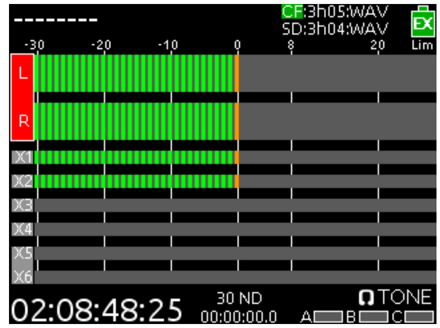
The three predefined meter views are:

- LR, 1-12 — This meter view (shown above) shows left and right bus tracks as well as all 12 input tracks.
- LR, X1, X2, RTNs — This meter view shows left, right, X1, and X2 bus tracks, plus all returns.
- LR, X1-X6 — This meter view shows left and right bus tracks as well as signal from X1 through X6.

The following images shows all three predefined meter views.







ⓘ *Use of the Mix Assist feature changes the appearance of the meters. For more information, see the chapter on Mix Assist.*

Using Meter Views

Although the first meter view is known as the Main screen, there are other screens, which may appear on the LCD, such as the Main menu or the Input Settings screen.

Regardless of what screen is visible, returning to the Main screen and its meter view is easy.

To return to the main screen at any time:

▶ Press the METERS button.

You can also easily switch to any of three different meter views.

To toggle between the three meter views:

▶ Press the METERS button. Each press of the button switches the display to the next view.

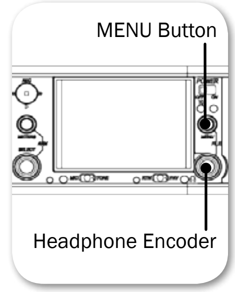
Customizing Meter Views

While the 688 provides three meter views by default, all three may be customized to display the information you deem most important.

To customize the meter views:

1. Press MENU.
2. Turn and press the Headphone encoder to select SYSTEM > Meter Views.
3. Select the meter view you would like to change.
4. Select the display option for that meter view.

Accessing the Main Menu

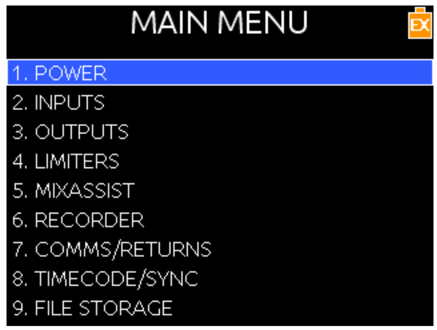


The majority of the 688’s settings are configured with the Main menu.

To access the Main menu:

▶ Press the MENU button.

The Main menu is made up of categories, each with its own set of sub-menu options. Turn the Headphone encoder to navigate the Main menu and press it in to select any category or sub-menu option.



While sub-menu options are covered in more detail throughout this guide in sections related to those options, the Main menu’s categories are provided with brief descriptions in the following table.

Category	Description
POWER	Settings related to external power sources. Also displays voltage level of External DC, Internal DC (AA), and PowerSafe™.
INPUTS	Settings related to channel linking, phantom power, PFL or Input modes, input to ISO routing, and input delays.
OUTPUTS	Settings related to output types or levels, output sources, output routing, and output delays.
LIMITERS	Settings related to input and output limiters.
MIXASSIST	Allows MixAssist to be enabled or disabled and inputs to be added or removed from MixAssist.
RECORDER	Settings to target recording media, WAV sample rate / bit depth, MP3 bit rate, and recording pre-roll time.
COMMS/RETURNS	Settings related to communications (Comm), including slate mic (source, gain, routing), comm return gain, and RTN and FAV switch actions.
TIMECODE/SYNC	Settings related to timecode and sample clock synchronization.
FILE STORAGE	Settings related to file storage and metadata.
SYSTEM	Various system settings.
QUICK SETUP	Allows user to save and recall user settings to and from SD, CF, and internal memory. Also allows resetting all settings to factory default.

Customizing the LCD and LEDs

Because the 688 is a portable field mixer, it may be used in a variety of environments, including some where lighting is an issue that requires adjustments to the mixer. With some System settings, you can modify the brightness levels of the LCD, the brightness levels of the LEDs, and even enable or disable the LCD Daylight mode.

To set the LCD brightness level:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > LCD Brightness.
3. Turn the Headphone encoder to change the value from 10 to 100%. Then press the encoder to make your selection.

   By default, the LCD brightness level is set to 100%.

To set the LCD brightness level:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > LED Brightness.
3. Turn the Headphone encoder to change the value from 5 to 100%. Then press the encoder to make your selection.

   By default, the LED brightness level is set to 60%.

Using LCD Daylight Mode

The default appearance of the LCD screen is a dark theme. However, a lighter theme is available as an alternative mode, which can make viewing in bright conditions easier. When enabled, the LCD Daylight mode may be toggled between dark and light themes.

To enable or disable LCD Daylight mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > LCD Daylight Mode.
3. Do one of the following:
   - Select On to enable.
   - Select Off to disable.

To toggle LCD Daylight mode:

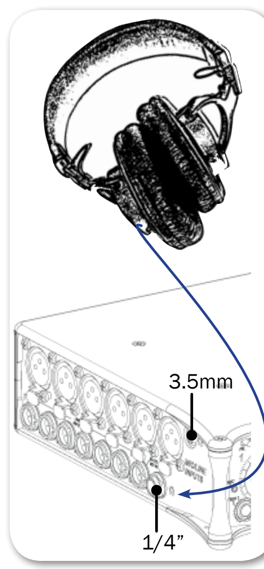
- SELECT + HP: simultaneously press the SELECT and Headphone encoders.

Headphone Monitoring

The 688 provides two headphone outputs on its left panel, several options for headphone sources including up to 10 custom presets, plus a variety of other customizable features related to audio monitoring.

Topics in this section include:

Connecting Headphones



Connect headphones to either the 1/4-inch or 3.5mm headphone outputs, located on the left panel of the 688.

⚠ ***The 688 can drive headphones to dangerously high volumes. Turn down the headphone gain before attaching headphones or selecting a headphone source to prevent accidental high levels.***

To adjust Headphone gain:

▶ Turn the Headphone encoder.

Selecting Headphone Source

The default list of headphone presets consists of six predefined headphone sources and 10 customizable presets.

To select a headphone source:

1. Press the Headphone encoder to display the list of available sources.
2. Turn the encoder to change the headphone source. Options include: LR ST, LR Mono, L Mono, R Mono, LR MS ST, X1X2, and HP Preset (1) through HP

Preset (10).

The headphone source changes immediately as it is highlighted in the list.

3. Press the encoder to close the list.

Headphone Encoder Mode

The default functionality of the Headphone encoder can be reversed so that the Headphone encoder must be pressed before turning to adjust the headphone volume, and headphone source can be selected by simply turning the Headphone encoder.

To set Headphone Encoder mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Headphone Encoder Mode > Preset/Vol.

Configuring the Headphone Preset List

Presets can be excluded from this list to make preset selection simpler.

To edit the Headphone Preset list:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Headphone Preset List.

   The Headphone Preset List will be displayed; presets with a blue background are visible, and presets with a black background are hidden.
3. Turn and press the Headphone encoder to toggle the visibility of each preset.

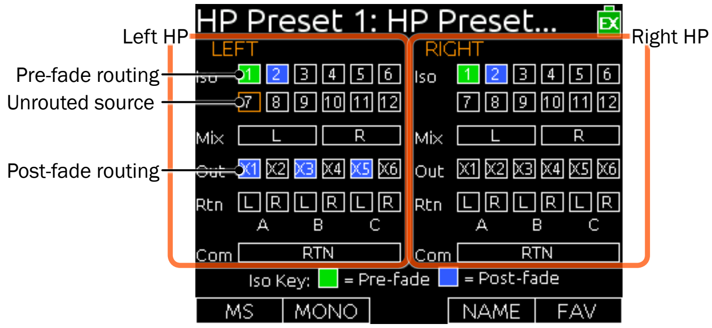
Defining Custom Headphone Presets

In addition to the six predefined headphone sources, 10 options are available as custom headphone presets.

To customize a headphone preset:

1. Press the Headphone encoder to display the list of available sources.
2. Turn the encoder to choose one of the 10 customizable preset options, such as HP Preset(1).
3. Slide the MIC/TONE switch left or right.

   The Headphone Preset Editing screen appears.



4. Do one of the following:
   - Turn the Headphone encoder to move the orange highlight horizontally.
   - Turn the Select encoder to move the orange highlight vertically.
5. Press the Headphone or Select encoder to change the selected source between Off (black), Post-fade (blue), and Pre-fade (green).

ⓘ *Only ISO sources have the pre-fade option.*

6. (Optional) Do any of the following:
   - Slide the MIC/TONE switch left to toggle MS decoding for this headphone preset.
   - Slide the MIC/TONE switch right to toggle mono summing for this headphone preset (All active sources will be summed into both headphone channels).
   - Slide the RTN/FAV switch left to name the headphone preset.
   - Slide the RTN/FAV switch right to toggle the favorite status of this headphone preset.
7. Press MENU or METERS to save the preset and exit the Headphone Preset Editing screen.

ⓘ *Only one preset at a time can be set as a favorite. Marking a preset as favorite will remove the favorite status of all other presets.*

Choosing a Favorite Headphone Preset

A single headphone preset can be designated as a favorite. This favorite headphone preset can be quickly accessed via the front panel.

To choose a predefined Headphone preset as favorite:

1. Press the Headphone encoder to display the list of available sources.
2. Turn the Headphone encoder to highlight the predefined preset you want. Options include: LR ST, LR Mono, L Mono, R Mono, LR MS ST, and X1X2.
3. Slide the RTN/FAV switch right to set the highlighted Headphone preset as your new favorite.

Headphone Source Shortcuts

There are a total of four headphone monitor shortcuts on the 688. By default, these shortcuts go to: RTN A, RTN B, COM RTN, and the headphone source set as favorite.

To monitor RTN A:

▶ Slide the RTN/FAV switch to the left.

To monitor RTN B:

▶ Hold down the Select encoder and simultaneously slide the RTN/FAV switch to the right.

To monitor COM RTN:

▶ Hold down the Select encoder and simultaneously slide the RTN/FAV switch to the left.

To monitor the favorite headphone source:

▶ Slide the RTN/FAV switch to the right.

ⓘ *These are the default headphone source shortcuts. These shortcuts may be customized via the Main menu's COMMS/RETURNS settings.*

Headphone Peak LED

The Headphone Peak LED, located just left of the Headphone encoder, illuminates red to indicate headphone output is approaching clipping level. Monitoring without a visual indication of headphone clipping can mislead a sound mixer into thinking the output or return feeds are distorted.

Power

The 688 utilizes different powering options, such as external DC power, or it may be powered by five AA batteries. When used with the SL-6 accessory, an optional powering and wireless system, the 688 may be powered via an NP1 battery.

The 688 also incorporates exclusive PowerSafe™ technology with smart sensing of available power sources, front panel power warning indication, and an integrated 10-second power reserve that safely stops recording and shuts down in the event of a power loss.

Topics in this section include:

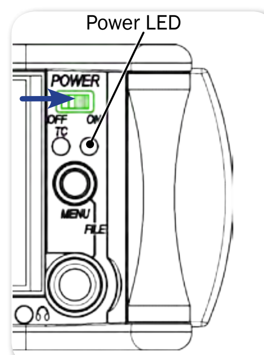
Powering the 688

The 688 operates on either external DC power or internal AA battery power.

To turn on the 688:

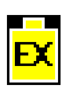
▶ Flip the Power switch to the ON position.

The Power LED illuminates yellow then green. The Sound Devices splash screen appears briefly on the LCD, and then the Main screen is displayed.



As part of the Main screen, the LCD displays a DC voltage indicator in the form of a battery icon that indicates the level of the power source (internal or external) currently in use.

Normal Voltage (Green)



Warning Voltage (Yellow)

Low Voltage (Orange)

Critical Voltage (Red)

Using External Power

The 688 uses only one power source at a time, with external DC power taking precedence over internal AA battery power.

To connect an external power source:

- ▶ Plug a DC power source (not included) into the 10-18 VDC input on the right panel.

ⓘ *Pin-4 of the locking, Hirose connector is positive (+) and pin-1 is negative (-).*

Using Battery Power

The 688 uses five AA batteries as a backup to external power. Alkaline AA batteries may be used with the 688; however, NiMH batteries are the preferred type because they provide for longer run times compared to Alkaline batteries.

To insert batteries:

1. Unscrew the battery cap (counter-clockwise).
2. Insert five AA NiMH batteries (not included) into the battery tube. Orient the batteries with the positive (+) end facing in and the negative (-) end facing out.

ⓘ *With external power connected, depleted AA batteries may be removed from the 688 and replaced with new ones without affecting operations.*

Voltage Ranges and Thresholds

The DC voltage indicator provides power status information based on the External DC Reference parameter, which defines the voltage range and warning threshold for external DC power sources. Setting the External DC Reference to a value appropriate for the type of external power being used maximizes runtime with that source.

For instance, the indicator appears solid green when the active power source is full or operating within the defined high voltage range. As the voltage depletes, the indicator’s color changes from green to yellow (warning) to orange (low) and to red (critical), based on the external power source’s range and threshold, as shown in the following table:

Ext DC Ref	Low Voltage	Warning Voltage	High Voltage
12V Ext DC	9	10	11
NiMH	11	11.5	13
Expanded NiMH	11	11.5	18
12V Lead Acid	10	11.4	14
14V Li-ion	12.5	13.5	16.3
Full Range	6	11.5	18

If the active power source is removed or its voltage drops to the critical threshold, the 688 switches to alternative battery power or shuts down, according to how its External DC Loss parameter is configured in the Power settings.

⚠ ***The DC voltage indicator flashes red when there are no other connected backup power sources remaining with adequate voltage. When all power sources are depleted, PowerSafe shutdown occurs automatically.***

To configure Power settings:

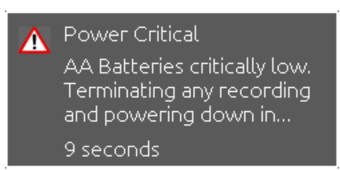
1. Press the MENU button.
2. Select Power.
3. Adjust the settings based on the following table:
   Defaults are indicated with **bold** font.

PARAMETER	DESCRIPTION	OPTIONS
Ext DC Ref	Calibrates the power level indicator according to the type of external DC source. By default, this is set to 12V Ext DC. Select the appropriate option for the external DC power.	• 12V Ext DC • NiMH • Expanded NiMH • 12V Lead Acid • 14V Li-ion • Full Range
Ext DC Loss	Choose what action the 688 should take when external power is removed or voltage drops below the set threshold. By default, this is set to Switch Power Source.	• Switch Power Source • Shut down

ⓘ *If the Ext DC Loss setting is configured to Switch Power Source when external power is lost, but there are no internal batteries with adequate voltage in the 688, then automatic PowerSafe shutdown will occur.*

PowerSafe™

When all connected power sources are depleted or power is lost unexpectedly, the PowerSafe circuitry activates. The 688 displays a warning, stops any active recordings, finishes writing files, and shuts down. The PowerSafe Battery powers the 688 during this time. This feature ensures that files are protected even in the event of unexpected power loss.



ⓘ *The PowerSafe Battery recharges from the active power source only when the 688 is powered on.*

QuickBoot

QuickBoot circuitry is enabled for two hours after the 688 is powered down. During this time, the 688 can turn on and start recording in less than two seconds. Each time the 688 is turned on and off, the two-hour timer is reset. Beyond the two-hour mark, QuickBoot is deactivated, so powering up results in a normal, slightly longer boot-up process.

Within the two-hour time frame, while QuickBoot is enabled, the internal Timecode (TC) generator continues to be active and the TC LED on the front panel of the 688 blinks every two seconds.

Forcing Power Off (Optional)

In the unlikely event you need to manually force a complete shutdown of the 688, by-passing the PowerSafe and QuickBoot features, do the following:

To force power off:

1. Slide the Power button to the left.
2. Press and hold the MENU button for 5 seconds.

After the 688 is manually powered off, the QuickBoot is reset and the TC LED no longer flashes.

Power Consumption

Many factors influence the rate at which the 688 uses battery power (current draw). The following list highlights the larger current drawing functions.

- Microphone powering — The main source of extra 688 current draw. 48 V Phantom can draw a large amount of current depending on what model microphone is used. Two identical phantom powered microphones draw twice as much current as one.
- Audio Recorder — The recorder, whether in record or playback, draws extra current. Higher sample rate WAV recordings draw more current during recording.
- Digital Outputs — Disable digital outputs in the Main menu when they are not needed since they draw additional current.
- Output level — Higher output levels into multiple, low-impedance inputs increases current draw.
- Headphone Output circuit - High headphone output levels and low impedance headphones increase current draw.
- LED and LCD Brightness — Decrease LED and LCD brightness to reduce current draw.

Inputs

The 688 has 12 analog inputs, which are assignable pre- or post- fade to outputs for optimum routing flexibility.

The inputs include six high-bandwidth mic/line inputs on XLR connectors, each complete with phantom power, high-pass filter, analog input limiter and variable pan.

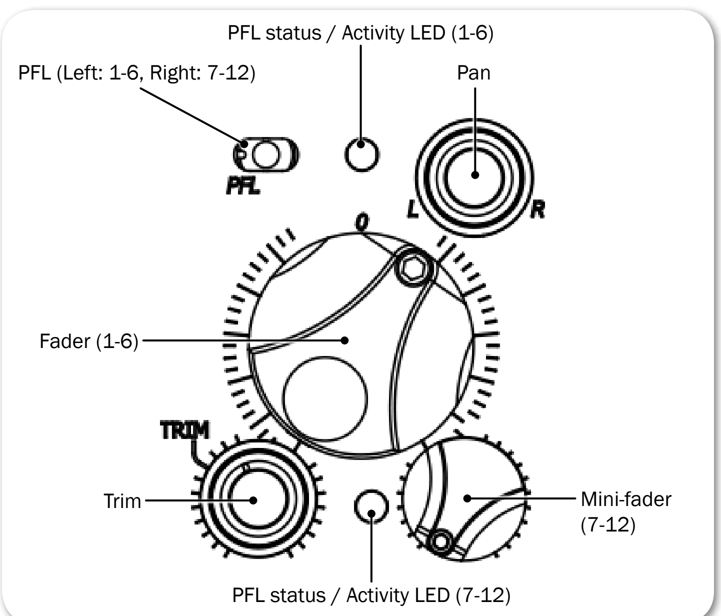
Six additional line-level inputs on TA3 connectors offer increased flexibility for more complex productions.

In addition to the primary inputs there are three stereo, unbalanced return (RTN) inputs.

Topics in this section include:

Physical Input Controls

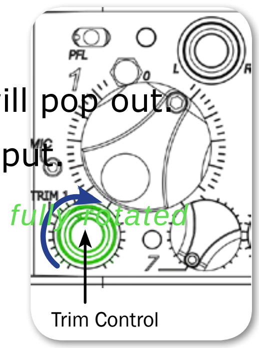
On the front panel, there are six sets of controls related to inputs, such as pans, faders, and trims.



The Trim, Pan, and Mini-fader controls may be pressed to retract the controls into the front panel when not in use.

Control	Description
PFL	Pre-Fade Listen (PFL) switch. Solos input signal in headphone monitors and displays Input Settings screen.
Fader 1-6	Adjusts fader level for inputs 1-6.
Trim 1-6	Adjusts trim level for inputs 1-6
Mini-fader 7-12	Adjusts fader level for inputs 7-12
Pan	Fades input signal between L and R tracks (If routed)
PFL Status / Activity LED	• Green: Signal present on input. • Red: Signal clipping on input. • Amber: Limiter engaged on input. • Blinking Yellow: Input soloed (PFL) in headphone monitors.

Activate an Input



To activate an input:

1. If the Trim control for an Input is recessed, push it in and it will pop out.
2. Turn the Trim control clockwise until it clicks to activate the input.

ⓘ *The input is deactivated whenever the Trim control for that input is fully rotated counter-clockwise.*

Input Setting Screens

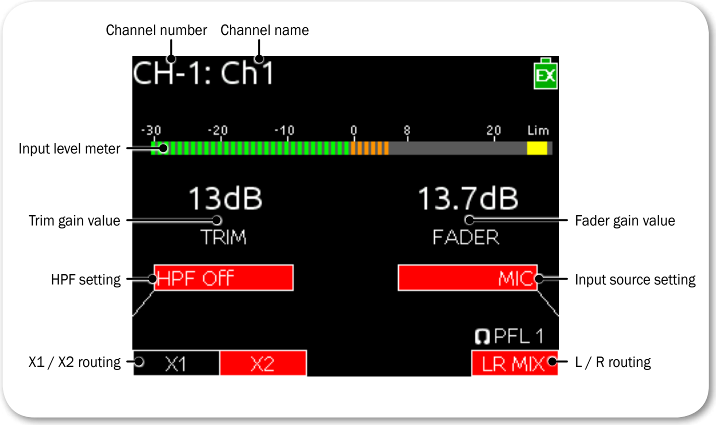
Each input has its own Input Settings screen. This screen provides access to the input’s settings, such as input source, high-pass filter, and track routing, and also displays information about the input’s gain and meter levels.

To access an Input Settings screen and PFL (solo) the input:

1. Ensure the chosen input has been activated.
2. Slide the PFL switch to the left for inputs 1-6 or right for inputs 7-12.

ⓘ *Step 1 is based on factory defaults. If sliding the switch to the left does not display the Input Settings screen, then the PFL Toggle Mode is not set to its 12-Channel default. When the PFL Toggle Mode is set to only 6 Channels, you must slide the PFL switch to the right instead of the left since sliding to the left is used to activate PFL without leaving the Main screen.*

All Input Settings screens share some common elements, such as channel name / number, level meter, trim gain value, fader gain value, X1/X2 routing, HPF, and source selection. Items displayed on the bottom half of the screen are adjusted by the physical controls that they are near: Select encoder, MIC/TONE switch, RTN/FAV switch, and Headphone encoder.



Input Settings screen for inputs 2, 4, and 6 include an INV option for inverting phase.

Inputs 7-12 allow separate routing to L and R tracks, since these inputs do not have pan controls.

Setting Input Source

Each input channel may be configured to receive signal from a unique source.

To set an input's source:

1. Slide the PFL switch left to access the Input Settings screen for that input.
2. Press the Headphone encoder to display the list of available input sources. Options include:
   - OFF – Use to deactivate an input without having to change trim.
   - MIC – Use for dynamic microphones or mic-level sources.
   - MIC-PH – Use for microphones requiring phantom power.
   - LINE – Use for analog line level sources.
   - LINE-PH – Use for phantom-powered condenser microphones. Provides 48V or 12V phantom power, but at a line-level gain range. Useful in high sound-pressure-level environments.
   - AES42 – Use for digital AES42 (Mode 1) microphones.
   - AES3 – Use for a digital AES3 source.
3. Turn the Headphone encoder to select an input source.

   Not all types of sources are available for each channel:

Input	Types
Channel 1	OFF, MIC, MIC-PH, LINE, LINE PH, AES 42, AES 3
Channel 2	OFF, MIC, MIC-PH, LINE, LINE PH ⓘ *AES 42, AES 3 is conditionally available only if Channel 1 is already set to AES 42 or AES 3*

Input	Types
Channel 3	OFF, MIC, MIC-PH, LINE, LINE PH
Channel 4	OFF, MIC, MIC-PH, LINE, LINE PH
Channel 5	OFF, MIC, MIC-PH, LINE, LINE PH ⓘ *AES 42, AES 3 is conditionally available only if Channel 6 is already set to AES 42 or AES 3*
Channel 6	OFF, MIC, MIC-PH, LINE, LINE PH, AES 42, AES 3

4. Slide the PFL switch to the left again to return to the Main screen.

Setting Input High-Pass Filters

Each input features a high-pass filter (HPF). The filter is off by default but may be adjusted from 80Hz to 240Hz in 10Hz increments.

To adjust an input's high-pass filter:

1. Access the Input Settings screen for the input to be adjusted.
2. Push the Select encoder. The HPF label will become orange to indicate adjustment.
3. Turn the Select encoder to adjust the value.
4. Press the Select encoder (or wait 2 seconds) to exit adjustment mode. The new value is saved, and the HPF label will become red again.

ⓘ *When RECORDER > Sample Rate is set to 192k, the HPF options are off and 50 Hz.*

Setting L, R, X1, and X2 Routing

Routing of inputs to L, R, X1, and X2 tracks can be adjusted quickly from the input settings screen. An input's routing to a track is indicated on the input settings screen with labels in the bottom left (X1/X2) and bottom right (L/R) of the LCD. A red label indicates the input is routed and a black label indicates the input is not routed.

To route inputs 1-6 to L and R tracks:

1. Access the Input Settings screen.
2. Slide the RTN/FAV switch right to toggle L and R track routing together.

ⓘ *Independent assignment of signal to the L and R tracks for inputs 1-6 is adjusted using the input's dedicated Pan control.*

To route inputs 7-12 to L and R tracks:

1. Access the Input Settings screen.

2. Slide the RTN/FAV switch right to toggle track R routing, or left to toggle track L routing.

To route any input to X1 and X2 tracks:

1. Access the Input Settings screen.
2. Slide the MIC/TONE switch right to toggle X2 routing, or left to toggle X1 routing.

ⓘ *An additional routing (“PRE”) is available for X1 and X2 routes. This indicates a pre-fader routing.*

Track Name Shortcut

An input’s track name can be quickly edited from the input settings screen.

To edit an input’s track name from the Input Settings screen:

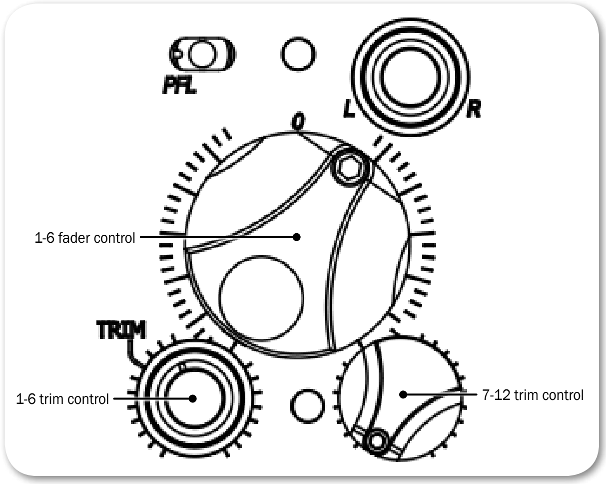
1. Access the Input Settings screen for the input to be adjusted.
2. Hold the same switch (or shortcut) used to access the Input Settings screen for 2 seconds. (For example, if the Input Settings screen was accessed by sliding the PFL switch to the left, then hold the same PFL switch left for 2 seconds). The on-screen keyboard will appear allowing entry of a text value.
3. When finished, slide the RTN/FAV switch right (or Enter on attached USB keyboard) to set the track name.

ⓘ *Track names can also be edited from the Take List.*

Adjusting Trim and Fader Controls

The gain of an input is adjusted by two controls, Trim and Fader. This two-stage architecture is identical to the topology of large mixing consoles and provides a great deal of control. Trim is often thought of as a coarse gain control and the Fader as the fine gain control.

The Fader is the primary control used while mixing, and it affects the level of input signal routed to all post-fade destinations. Use the Fader control to make fine gain adjustments. The Fader control can be attenuated from off (at full counter-clockwise position) to +16dB above the set trim level (at full clockwise position). Operate input faders at or near 0dB, the unity gain (12 o’clock) position to optimize gain structure for the best performance.



To adjust trim and fade:

1. Access the Input Settings screen for the chosen input.
2. Do one of the following:
   - For inputs 1-6: Set Fader control to 0dB, the unity gain position.
   - For inputs 7-12: Set Mini-Fader control to 0dB. If the Mini-fader control is recessed, push it in and it will pop out.
3. Adjust the input’s Trim control clockwise until optimal level is achieved on metering and in headphones.

   Analog trim level is adjustable from +22 to +72 DB of gain. The digital trim level is adjustable from -20 to +40 dB.

Adjusting Trim - Inputs 7-12

Inputs 1-6 have dedicated Trim controls, but that is not the case for inputs 7-12.

ⓘ *By attaching the optional CL-6 accessory, which provides additional dedicated controls, the functionality of the Mini-faders on the 688 changes to become Trim controls.*

To adjust trim for inputs 7-12:

1. Access the Input Settings screen for the input chosen from 7-12.
2. Rotate the SELECT encoder to adjust the trim level. The gain value is displayed on the Input Settings screen.

Adjusting Pan

The Pan pot routes inputs to the left (L) and right (R) channels of the stereo Master Bus. The Pan pot has a detent in its center (12 o’clock) position.

To adjust an input's pan:

▶ Turn the Pan pot.

After setting the pan, press the Pan pot in to recess the control when not in use.

Input Settings

The Main menu has a sub-menu of settings related to inputs. These may be used to customize the configuration of the 688.

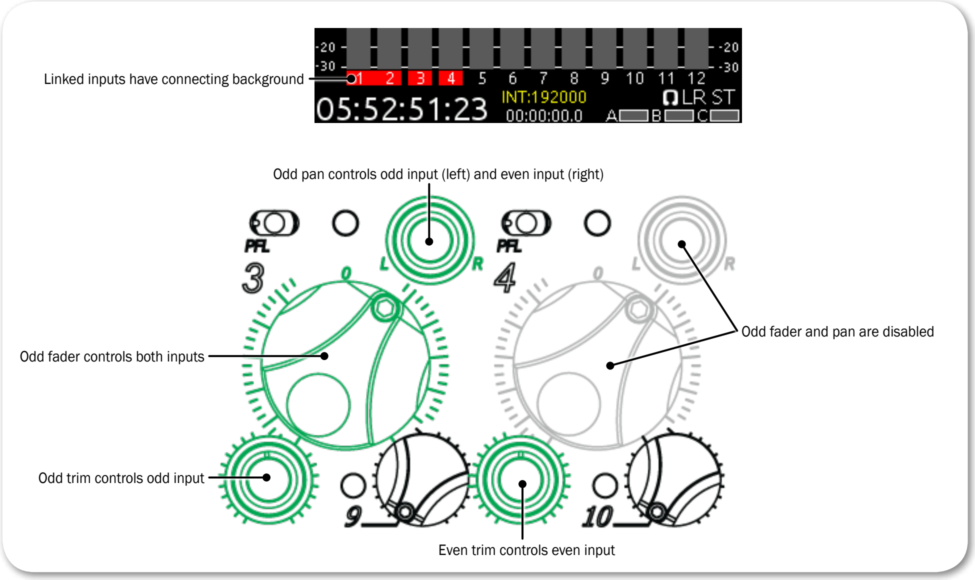
To access Inputs sub-menu:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select INPUTS.

Sub-menu	Description	Options
Channel Linking	Sets channel linking for each input pair: 1-2, 3-4, 5-6, 7-8, 9-10, 11-12.	• Unlinked • [ch#-ch#] • [ch#-ch#]MS ⓘ *ch# represents the numerical value of the selected input pair.*
Phantom Voltage	Globally adjusts voltage level of phantom power (on all inputs which have phantom power enabled).	• 48V • 12V
PFL Toggle Mode	Globally alters the behavior of PFL switches. This option is disabled when the CL-6 is attached.	• 12ch • 6ch
Input to ISO Routing	Sets pre- or post-fade status of each input's routing to its ISO track.	• Prefade • Postfade
Input Delays	Sets delay for each input's signal up to 30 ms in 0.1 ms increments.	• 0.0 - 30.0 ms

Configuring Linking

Pairs of adjacent inputs may be linked (1-2, 3-4, and 5-6). Linked inputs share a common fader. The pan control of the odd input controls the balance of both signals to the L-R, and X1-X2 tracks. The following illustration indicates which controls are active and what those controls do when inputs are linked.



To configure channel linking:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select INPUTS > Channel Linking.
3. Turn and press the Headphone encoder to select the input pair.
4. Turn and press the Headphone encoder to set linking, indicated by pairs. Options include: Unlinked, Linked (pair), or Linked (pair) MS.

   For instance, selecting 1-2 configures channel linking for input pair 1 and 2. Selecting 3-4 MS, configures Mid-Side linking for input pair 3 and 4.

MS Linking

When input pairs are linked Mid-Side (MS), the odd channel is used for the Mid signal and the even channel is used for the Side signal. To produce a stereo signal from an MS configuration, the signal from both microphones must be processed.

Configuring Phantom Voltage

Phantom powering is a fixed DC voltage of either 12 or 48 volts. This voltage is resistively applied to pin 2 and pin 3 of an input's XLR-3F connector, relative to pin 1. In this configuration, there is no voltage difference between signal pins 2 and 3.

On the 688, the factory default sets phantom power voltage to 48 volts, but that may be changed.

To configure phantom voltage:

1. Press the MENU button.

2. Turn and press the Headphone encoder to select INPUTS > Phantom Voltage.
3. Turn the Headphone encoder to change the setting. Options include: 48V or 12V.

   This setting globally adjusts the voltage level of phantom power on all inputs with phantom power enabled.

Configuring the PFL Toggle Mode

By default, access to PFL and the Input Settings screen for inputs 1-12 can be achieved with one hand. This is called 12-Channel mode.

However, the PFL switches on the 688 may be configured to focus operation solely on inputs 1-6, while leaving inputs 7-12 accessible via a button combination. This configuration option is called 6-Channel mode.

To enable 6-Channel PFL Toggle mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select INPUTS > PFL Toggle Mode > 6ch.

Solo (PFL) for inputs 1-6 while in 6-Channel mode:

▶ Slide PFL switch left.

Access inputs 1-6 Input Settings screens while in 6-Channel mode:

▶ Slide PFL switch right.

Solo (PFL) for inputs 7-12 while in 6-Channel mode:

▶ SELECT + PFL: press SELECT encoder and slide PFL switch left.

Access inputs 7-12 Input Settings screens while in 6-Channel mode:

▶ SELECT + PFL: press SELECT encoder and slide PFL switch right.

Configuring Input to ISO Routing

By default, each input is routed to its associated ISO track pre-fade (The fader does not affect the signal on the ISO track). This routing can be configured (on a per-input basis) to be post-fade (The fader does affect the signal on the ISO track).

To configure Input ISO Routing:

1. Press the MENU button.

2. Turn and press the Headphone encoder to select INPUTS > Input to ISO Routing.
3. Turn and press the Headphone encoder to select the desired input routing and edit its value.
4. Turn and press the Headphone encoder to select Prefade or Postfade.

ⓘ *Input to ISO Routing for inputs 1-8 also affects the pre- or post-fade status of those inputs’ routing to AES digital tracks.*

Configuring Input Delay

Input delay is applied before the signal is sent to the recorder and outputs. Each input can be delayed up to 30ms.

To configure input delay:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select INPUTS > Input Delays.
3. Turn and press the Headphone encoder to select the input. The background of the value will become orange to indicate the value is being edited.
4. Turn and press the Headphone encoder to set the new delay value for the chosen input.

Outputs

The 688 offers multiple outputs with flexible configuration. Whether you need to send the LR mix to multiple cameras, the camera RTN feed via IFB, or AES digital signals, the 688 is up to the task.

The right panel features three master LR bus transformer balanced outputs via two 10-pin hirose connectors and two XLR-M connectors, which can alternatively be used to send up to eight signals (four pairs) of AES digital, four active balanced Aux outputs via TA3, an additional unbalanced stereo Aux output via TA3, and a 3.5 mm unbalanced stereo Tape Output.

Topics in this section include:

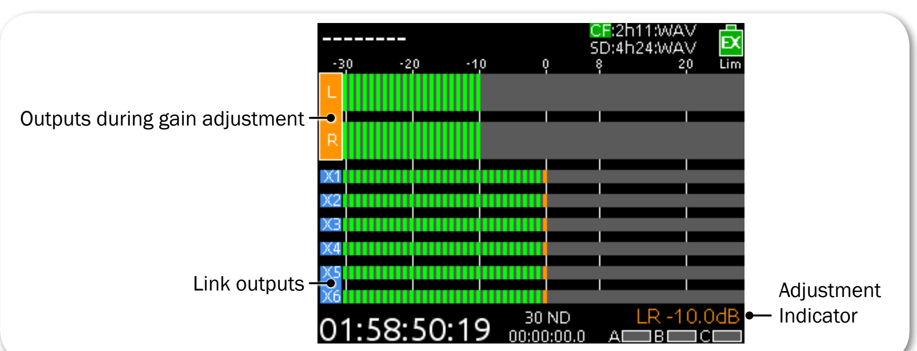
Output Connections

On the 688, the Left and Right XLR-M and Hirose 10-pin connectors are each transformer balanced from separate windings. This improves isolation from potential interference. Aux outputs X1 to X4 use active-balanced TA3 connections. The Tape Out (3.5mm), X5/X6 output (TA3), and Headphone output (3.5mm and 1/4”) are all unbalanced stereo connections.

ⓘ *See Specifications chapter for full details on the electronic specifications of the various output connections.*

Adjusting Output Gain

Output gain is adjusted from the Output meter view. The output meters have blue indicators.



To adjust output gain:

1. Press the METERS button repeatedly until the Output meter view is visible.

ⓘ *If the Output Meters view is not available, it must be selected as one of the three views in main menu option SYSTEM > Meter Views.*

2. Turn and press the SELECT encoder to choose an output and enter gain adjustment. The background color of the chosen output becomes orange, and the output gain value is displayed in the lower-right corner of the screen.
3. Turn the SELECT encoder to adjust the output gain.
4. Press the SELECT encoder or wait 2 seconds to exit Gain Adjustment mode.

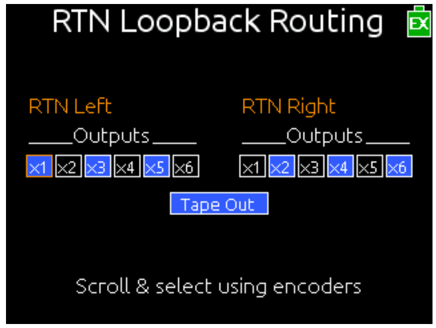
Output Settings

The Main menu has a sub-menu of settings related to outputs. These may be used to customize the configuration of the 688 outputs.

To access Outputs sub-menu:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS.

Sub-menu	Description	Options
Linking	Choose which output pairs are linked for the purpose of arming and level adjustment. (L/R, X1/X2, X3/X4, X5/X6)	• Linked • Unlinked
Levels/Type	Select the nominal level of analog outputs or switch the output to send AES digital digital signals. (L, R, 10-pin A, 10-pin C, X1-X4).	• Mic • Line • -10 • AES (XLR, L/R, 10-Pin A only)
AES Output Routing	Displays the AES output routing matrix where sources can be assigned to AES output channels.	
X1-X6 Routing	Choose sources for X1-X6 outputs for live and playback.	
Playback to LR Outputs	Whether or not playback of L and R tracks is sent to the main L and R analog outputs.	• Yes • No
Tape Out Source	The source for the unbalanced 3.5mm Tape Out.	• L/R • RTN A • RTN B • RTN C
Output Delays	Set the delay of L-R, X1, X2, X3, X4, and X5-X6, per output.	• 0 - 417 ms (per output)

Sub-menu	Description	Options
RTN Loopback Routing	Displays the RTN Loopback Routing screen.  Select output sources for Return Loop-back mode.	• RTN Left: X1 - X6 • RTN Right: X1 - X6 • Tape Out

Output Linking

Output linking allows the gain, delay, and track arm status (L, R, X1, X2 only) of an output pair to be controlled with only one action. By default, the output gain of L/R and X5/X6 are linked and X1-X4 are unlinked.

L/R, X1/X2, X3/X4, and X5/X6 pairs can be linked or unlinked from the Main menu.

To configure output linking:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > Output Linking.
3. Turn and press the Headphone encoder to select the desired output pair and adjust its linked status.

Setting Output Type and Nominal Level

By default, left XLR, right XLR, 10-pin A, and 10-pin C balanced outputs are set to analog Line (+4 dBu nominal) level. However, each output may be set to Mic, Line, and -10 (analog). Additionally, left XLR, right XLR and 10-pin A may be set to AES (digital).

To set output level and type:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > Levels/Type.
3. Turn and press the Headphone encoder to select the output. Options for each output will vary, but can include: Mic, Line, -10 or AES.

Output Routing

The master L and R tracks are permanently routed to their respective outputs, unless the connections have been set to AES, in which case they use AES output routing.

AES Output Routing

There is a total of 8 channels of digital output on 4 connections. Each of the XLR-3M or 10-pin A outputs can be configured to output AES3 digital signals. For more information, see*see Setting Output Type and Nominal Level*.

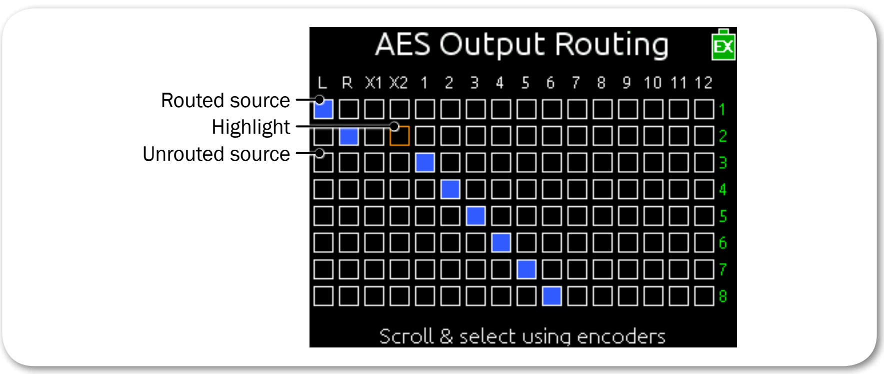
Any track can be routed to any AES output in any combination. No sources are assigned to any of the 8 AES outputs by default.

To access the AES Output Routing screen:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > AES Output Routing.

AES Output Routing Screen

The AES Output Routing screen consists of rows that represent each AES output and columns that represent the available source for those outputs.



To configure output sources in the AES Output Routing screen:

1. Do one of the following:
   - Turn the Headphone encoder to move the orange highlight horizontally.
   - Turn the Select encoder to move the orange highlight vertically.
2. Press the Headphone or Select encoder to change the selected source between Off (black) and On (blue).

Aux (X1 - X6) Routing

X1 and X2 tracks are routed to their respective outputs by default. Output sources are configured in the Output routing screen.

To access the Aux Output Routing screen:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > X1-X6 Routing.
3. Turn and press the Headphone encoder to select an output.

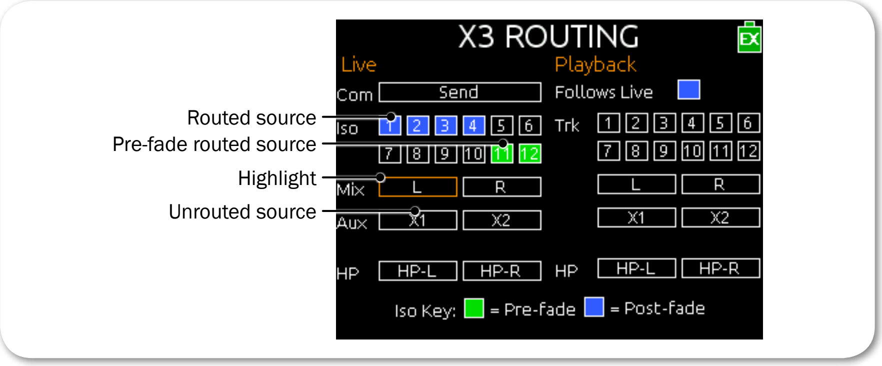
Aux Output Routing Screens

The Aux Output Routing screen consists of boxes that indicate sources available for routing to the chosen output.

The sources are arranged in two sections:

- Live (left half of screen)
- Playback (Right half of screen)

Upon playback, all sources configured in the Playback section will be used. Sources configured in the Live section are used at all other times.

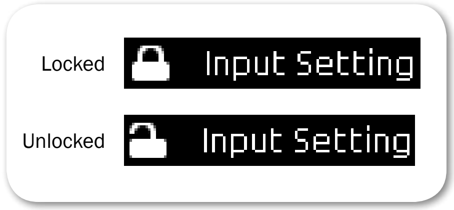


ⓘ *The Aux Output Routing screens have a Com Send option, a feature explained in the Comms/Returns section of this guide.*

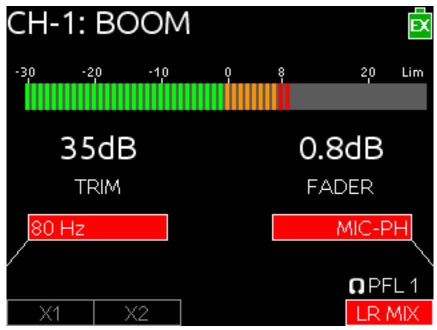
This flexibility in routing is useful for situations where the live feed to the Aux outputs is not the same program you want to send when playing back. For instance:

- Live source sent to the Aux output was not recorded and therefore does not playback.
- During playback, you want to feed loud speakers, but in Live mode, you don't want anything feeding the speakers.
- Boom op gets fed a mono mix of his isolated channel during Live mode, but during playback, he will receive the LR mix.

The X1 and X2 Output Routing screens differ from the other Output Routing screens. Aux and HP sources are not available, but an additional Input Setting appears:



When Input Setting is set to Locked, changing the X1 and X2 routing from the Input Settings screens is disabled, preventing accidental routing of channels to those outputs using the MIC/TONE switch.



To configure output sources in the Aux Output Routing screen:

1. Access the Aux Output Routing screen.
2. Do one of the following:
   - Turn the Headphone encoder to move the orange highlight horizontally.
   - Turn the Select encoder to move the orange highlight vertically.
3. Press either encoder to change the selected source between Off (black) and On (blue).

ⓘ *In addition to Off and On, ISO sources have a third option, Pre-Fade (green).*

Activating an ISO source will change all Mix, Aux, and HP sources to Off. Activating a Mix, Aux, or HP source will change all ISO sources to Off.

The Follows Live box is not an output source, but an option. When active, the output's sources do not change from the Live configuration upon playback.

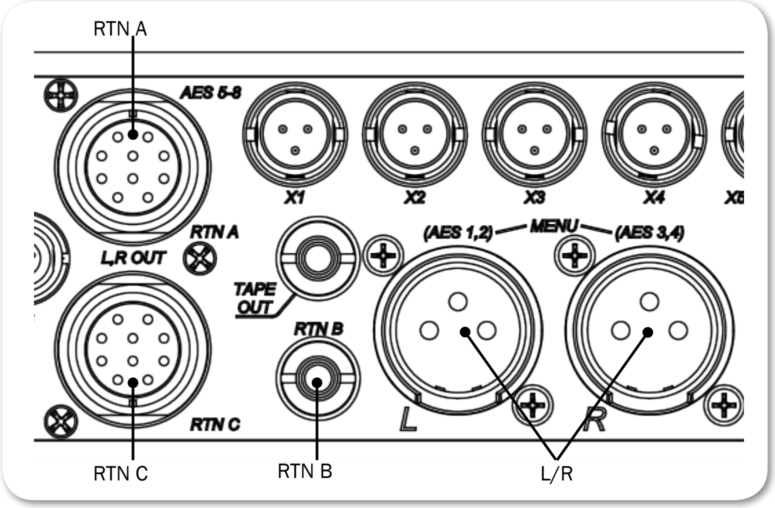
Tape Output Routing

Tape Output is often used to send signal from a camera to a producer or director over an IFB. The default source for Tape Output is the master L and R tracks. However, any return signal can be routed to the Tape Output instead.

To configure the Tape Output source:

1. Press the MENU button.

2. Turn and press the Headphone encoder to select OUTPUTS > Tape Out Source.
3. Choose a source to be routed to Tape Output. Options include: L/R, RTN A, RTN B, or RTN C.



Playback to LR Outputs

By default, audio on L and R recorded tracks will be sent to the headphone outputs and both L and R outputs during playback. This can be disabled so that LR analog outputs do not send the playback signal to the L and R outputs.

To enable or disable playback to LR Outputs:

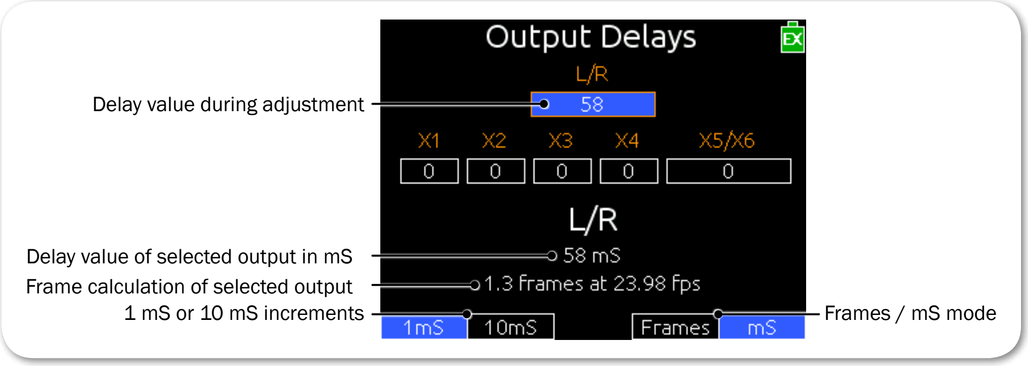
1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > Playback to LR Outputs.
3. Turn and press the Headphone encoder to select Yes or No.

Output Delay

The signal of each output can be delayed up to 417 milliseconds. This is useful while interfacing with video equipment when the audio signal is being processed faster than video, creating an audio/video offset.

To adjust output delay

1. Press the MENU button.
2. Turn and press the Headphone encoder to select OUTPUTS > Output Delays.



3. Turn and press the Headphone encoder to enter delay adjustment mode. The background of the selected delay becomes blue.
4. Turn the Headphone encoder to adjust the delay value.
5. Press the Headphone encoder to set the delay value.
6. (Optional) Do any of the following:
    - ▶ Slide the RTN/FAV switch left to adjust values in frames.
    - ▶ Slide the RTN/FAV switch right to adjust values in milliseconds.
    - ▶ Slide the MIC/TONE switch left to adjust in 1 mS increments.
    - ▶ Slide the MIC/TONE switch right to adjust in 10 mS increments.

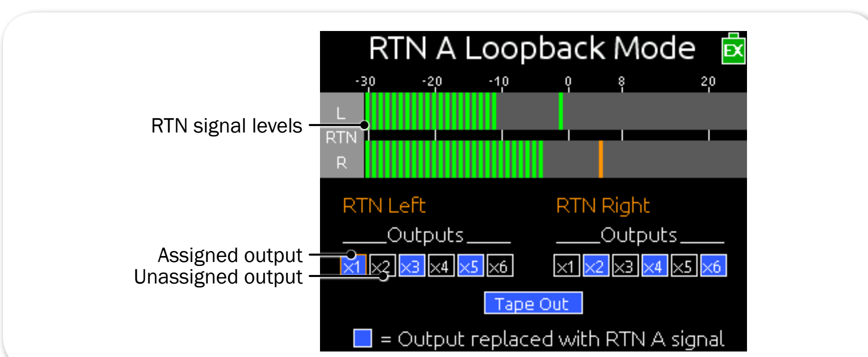
Return Loopback Mode

Return Loopback mode temporarily replaces the output source with the selected RTN signal. This is useful for sending camera audio playback to a producer or director.

To enter Return Loopback mode:

▶ Press MENU + RTN switch action.

ⓘ *"RTN switch action" is whatever action is defined for monitoring the chosen return in the Main menu's COMMS/RETURNS > RTN Switch Action and COMMS/RETURNS > FAV Switch Action settings.*



For instance, in the sample screenshot, the left side of RTN A is being sent to X1, X3, and X5 and the left side of Tape Out, while the right side of RTN A is being sent to X2, X4, X6 and the right side of Tape Out.

This change in output sources is only active when the mode is active and the RTN Loopback Mode screen is displayed. The sources normally assigned to outputs are restored when RTN Loopback Mode screen is exited.

To exit Return Loopback mode:

▶ Press the METERS button.

Outputs to be replaced with RTN signal can be configured from the Return Loopback Mode screen or via the Main menu's OUTPUTS > RTN Loopback Routing.

To configure outputs for Return Loopback mode:

1. Do one of the following:
   - ▶ Enter Return Loopback mode.
   - ▶ Press MENU and select OUTPUTS > RTN Loopback Routing.
2. Turn and press the Headphone encoder to toggle the assignment of outputs.

ⓘ *Return Loopback mode outputs apply to all returns.*

Sending Tone to Outputs

The 688's internal tone oscillator can be used to send a predefined tone or pulse to the mixer's outputs to aid setup of proper gain staging with other equipment, such as cameras. The Left Indent pulsing tone is useful for identifying the left or odd Aux channel of the stereo pair on the receiving device.

To send a continuous tone to outputs:

▶ Do one of the following:
- Slide the MIC/TONE switch to the right for a brief burst of tone.
- Slide and hold the MIC/TONE switch for one second to turn on a continuous tone. Slide the switch again to turn off the tone.

By default, 1000 Hz tone is sent at 0 dB to all outputs and tracks.

To send an L Ident pulsing tone:

▶ Press and hold the SELECT encoder then slide the MIC/TONE switch to the right.

By default, a continuous tone is sent to outputs while the Left Identifier signal pulses the amplitude of tone by -20 dB to the Left channel, X1, X3, and X5 outputs. Repeat the SELECT + TONE combination to turn off the L Ident pulse.

These factory defaults may be customized via System settings. Custom configuration includes: routing to outputs or tracks, setting decibel level and frequency, and changing the functionality of the MIC/TONE switch actions.

Limiters

Limiters prevent clipping by attenuating signals that exceed a set threshold. The amount of attenuation is defined by the ratio of the limiter and expressed as two numbers.

The time it takes for limiting to begin once signal has exceeded the threshold is referred to as the attack time, and the time it takes for limiting to cease once signal has fallen back below the threshold is referred to as release time.

Topics in this section include:

Overview

Sound Devices recommends using limiters at all times. Without input limiters, high signal conditions can overload a channel and cause distortion. In normal operation, with a properly set gain structure, the threshold of the input limiter is rarely reached. The default threshold of all limiters on the 688 is 16dBu.

All 688 limiters use a 20:1 compression ratio. This means that any signal that exceeds the threshold by 20 dB will exit the limiting stage at only 1 dB above the threshold. The 688 limiters have a 1 ms attack time and a 500 ms release time.

The input limiter is actively limiting when the respective input's Input Activity LED illuminates yellow. Limiting activity will also be displayed as a yellow square on the right side of the input's meter on the Main screen. If the limiting activity is regularly indicated, reduce the amount of gain applied to the channel by turning down the Trim control.

Enabling the Limiters

When enabled, the limiters are globally activated at either a Hard Knee or Soft Knee setting. The knee of the limiter determines how the limiter operates in relation to the set threshold. With hard knee, when the signal reaches the threshold, the mixer immediately attenuates only those peaks above the threshold, compressing at whatever ratio is set. With soft knee, attenuation begins slightly before the threshold—at about 6 dB—for a more gradual, tape-like sound, making the compression much more difficult to detect.

To enable or disable limiters:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select LIMITERS > Limiter Enable.
3. Turn and press the Headphone encoder to activate or deactivate the limiter. Options include: Off, Hard Knee, and Soft Knee.

Adjusting the Threshold

The default threshold of all limiters is 16 dBu; however, that may be adjusted from 4 dBu to 18 dBu in 1 dBu increments.

To adjust the threshold:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select LIMITERS.
3. Define the threshold parameters based on the following table:

Parameter	Description	Options
Input 1-6 Post-Fade Threshold	Sets the level at which input limiters will begin attenuating on inputs 1-6.	• +4 dBu - +18 dBu (1 dBu increments)
L, R Threshold	Sets the limiter threshold for the Master Bus.	• +4 dBu - +18 dBu (1 dBu increments)
X1, X2 Threshold	Sets the limiter threshold for the Aux Bus.	• +4 dBu - +18 dBu (1 dBu increments)

Linking Limiters

Limiters for L, R and X1, X2 channel pairs can be linked on the 688. Anytime two limiters are linked, both channels will be limited when signal reaches the threshold in any channel of the pair.

ⓘ *Linking inputs as a stereo pair also links those inputs' limiters.*

To link limiters:

1. Press the MENU button.
2. Do either one or both of the following:
   - Turn and press the Headphone encoder to select LIMITERS > L, R Linking.
   - Turn and press the Headphone encoder to select LIMITERS > X1, X2 Linking.
3. Turn and press the Headphone encoder to set linking. Options include: On or Off.

MixAssist™

The 688's powerful digital processing engine delivers 12-channel auto-mixing capability using the most sophisticated algorithm on the market.

MixAssist automatically attenuates the level of inputs that are not open and helps maintain consistent background sound levels regardless of the number of open microphones. This automatic attenuating function is commonly referred to as "auto-mix".

MixAssist intelligently attenuates redundant mics picking up the same sound source which significantly helps to reduce comb filtering and phasing artifacts.

Topics in this section include:

Overview

The MixAssist feature auto-mixes post-fade input signals to the L and R buses. Other signals are not affected by MixAssist.

Inputs that are auto-mixed will be open (unattenuated) when a person talks into the input's microphone and closed (attenuated) when the person stops talking. Microphone channels open with ultra-sensitive responsiveness to voice levels to ensure that no syllables are lost, and then will "gate off" smoothly over 500mS. This gating action is smooth and imperceptible when switching between microphones. MixAssist is more sophisticated than a simple gate, and uses four different principles to automix input signals.

MixAssist will allow several microphones to be open simultaneously if there are several talkers, and MixAssist does not limit the number of open microphones.

Noise Adaptive Threshold

When an input's post-fade level surpasses the MixAssist threshold, it will be opened. Unlike a simple limiter or gate, this threshold is dynamic: MixAssist continuously analyzes all inputs assigned to it to determine an average noise floor level and uses that level as the threshold. This prevents common background noise (fans, crowd murmur, etc) from causing the input to open, while allowing normal sounds to open the mic.

One Mic Per Sound Source

Often a sound source, such as someone speaking, is captured by more than one microphone. MixAssist actively compares signals from all inputs and when it senses the same audio on multiple inputs, it will only open the input in which that specific program audio arrived first and is loudest.

ⓘ *This does not prevent another input from opening when unique program audio is sensed at that input.*

Number of Open Microphone Attenuation

As the number of open inputs increases, the level of each input as it is routed to the track will decrease by 3 dB per doubling of open mics. This ensures that the overall level of the track is consistent regardless of the amount of open inputs routed to it.

Last Mic Lock-On

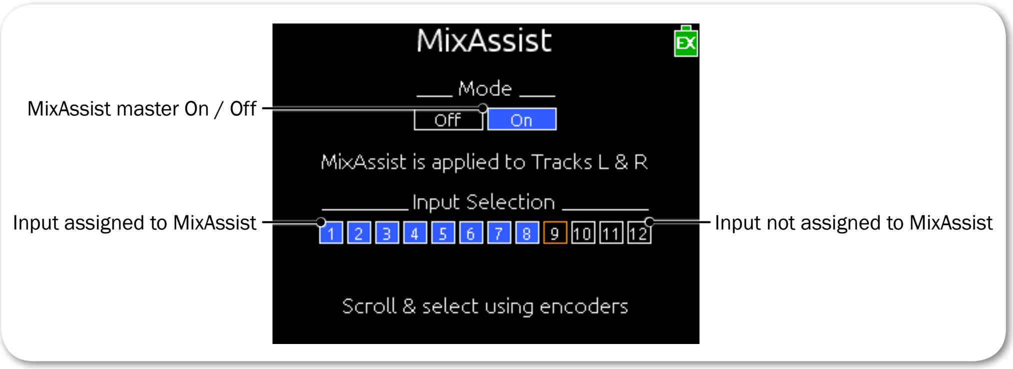
When talking stops, the last input to be active will remain open. This maintains a consistent level of natural sound and avoids a dramatic transition to silence on the track, even when no inputs are in use.

MixAssist Setup Screen

While MixAssist on the 688 is capable of auto-mixing all 12 inputs, MixAssist may be configured, from the MixAssist screen, to attenuate fewer inputs or none at all.

To access the MixAssist screen:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select MIXASSIST. The MixAssist screen is displayed.



Turning MixAssist On or Off

By default, the MixAssist feature is turned off.

ⓘ *MixAssist is also disabled automatically when Main menu option RECORDER > Sample Rate is set to a value higher than 48.048 kHz.*

To turn MixAssist on or off:

1. Access the MixAssist screen.
2. Turn the Headphone encoder to move the orange highlight horizontally.
3. With the orange highlight positioned on the selected mode, press the encoder to select On or Off.

Assigning Inputs to MixAssist

Inputs that are assigned to MixAssist are referred to as active MixAssist inputs. Inputs not assigned to MixAssist are referred to as inactive MixAssist inputs.

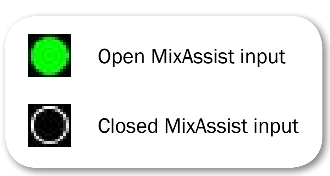
To assign inputs to MixAssist:

1. Access the MixAssist screen.
2. Do one of the following:
   - ▶ Turn the Headphone encoder to move the orange highlight horizontally.
   - ▶ Turn the Select encoder to move the orange highlight vertically.
3. With the orange highlight positioned on the selected source, press either encoder to change the selected source between Off (black) and On (blue).

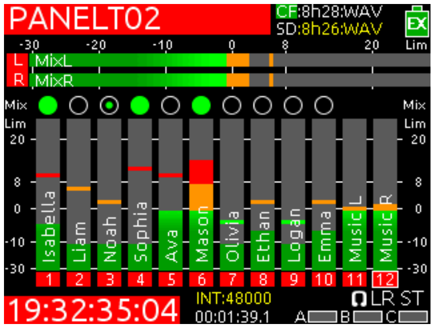
ⓘ *Inputs that are routed post-fader to the L or R bus and do not have automix activated will not be automixed but will still be analyzed by Mix Assist for the purposes of Last Mic Lock-On, One Mic Per Sound Source, and Number of Open Mics Attenuation.*

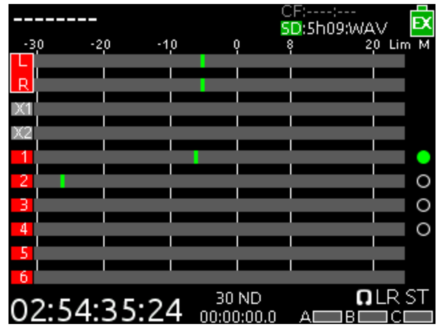
LCD Views During MixAssist

A circle icon is displayed next to the meter for each active MixAssist input. When the input is open, the circle will be green. As the input closes, the circle will fade to black.

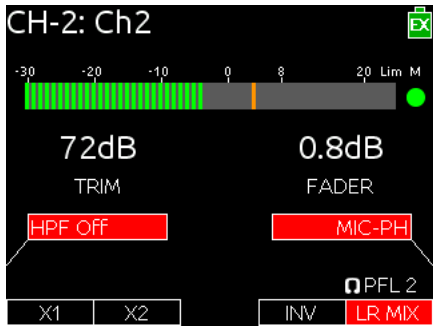


The Meters view will display these circle icons above (vertical meters) or to the right of (horizontal meters) the active MixAssist inputs.





The Input Settings screen will display the circle icon to the right of the meter.



Recording

The 688 offers 16-track, polyphonic or monophonic broadcast WAV file recording to Secure Digital (SD) and CompactFlash (CF) cards. These memory cards are an easy-to-source, reliable, and affordable file storage option that also may be quickly delivered to post immediately after recording stops.

All common sampling rates are supported, including up to six tracks at 192 kHz.

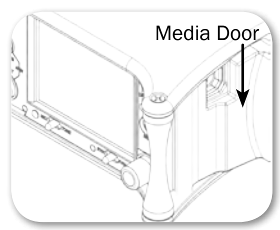
The memory cards can be set independently, recording either identical material for real-time backup, or combinations of WAV Poly, WAV Mono and MP3 files.

Topics in this section include:

Using Media

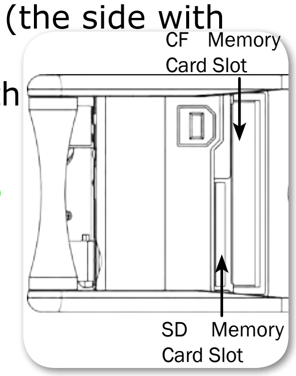
Before recording anything, install and format the media storage memory cards you intend to use in the 688. The slots for memory cards are located on the right panel behind the Media Door, which is held closed magnetically.

To insert media:



1. Firmly pull open the Media Door.
2. Insert your choice of media memory card into the slots provided.

   When inserting the SD card, ensure the bottom of the card (the side with metal contacts visible) is facing the rear of the unit. When inserting a CF card, ensure the top of the card (the side with the branding label) is facing the rear of the unit.

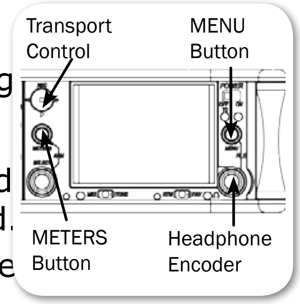


ⓘ *Sound Devices Quality Assurance engineers have done extensive testing to ensure media approved for use with the 688 works reliably and provides the best performance in a variety of extreme conditions. When choosing your media, please refer to the Approved Media List available on the Sound Devices website at: www.SoundDevices.com/ApprovedMedia.*

The memory card must be formatted before recording.

⚠ ***Reformatting a card will erase all data on the card.***

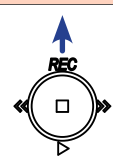
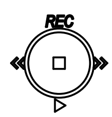
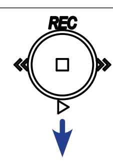
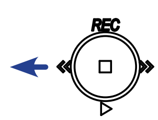
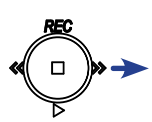
To (re)format an SD or CF card:



1. Press the MENU button.
2. Turn and press the Headphone encoder to select File Storag
3. Do either of the following:
   - Select Erase/Format CF to reformat a Compact Flash card
   - Select Erase/Format SD to reformat a Secure Digital card.
4. Press the Headphone encoder to begin the formatting proce
5. Read any warning message(s) and press the Headphone encoder to continue.
6. Press the METERS button to return to the Main screen.

Transport Control

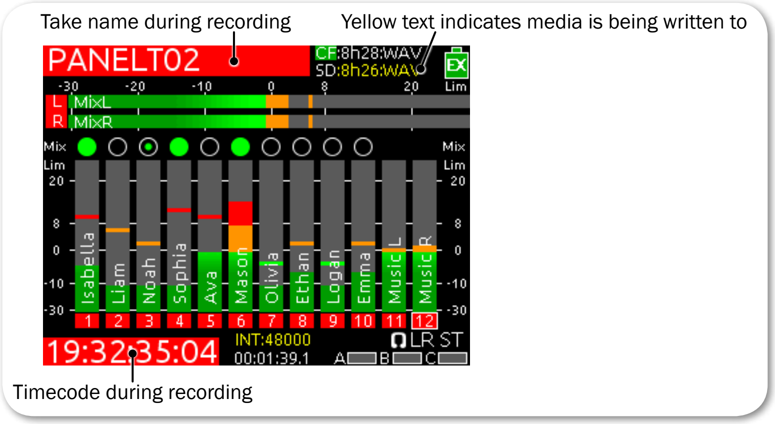
The 5-position Transport control is used to perform all recording and playback functions.

Function	Direction	Action
Record		Push up the Transport Control. Begins recording a new file.
Pause / Stop		Press in the Transport Control. While recording, press once to stop recording. While in playback, press once to pause, and press again to stop. While in standby, press and hold to display next take name.
Play		Push down the Transport Control. Begins playback of the last file recorded or file currently loaded.
Rewind / Load previous take		Push the Transport Control Left. While in standby, push left to load the previous take. While in playback, push and hold left to rewind.
Fast forward / Load next take		Push the Transport Control Right. While in standby, push right to load the next take. While in playback, push and hold right to fast forward.

To make a recording:

1. Push up the Transport control. Recording will begin.

While recording, both the take name background color (top of Main screen) and timecode counter (bottom left of Main screen) will become red, and the absolute time counter (bottom of Main screen) will run. Additionally, the time remaining value of CF and SD will appear yellow while the media is being accessed.

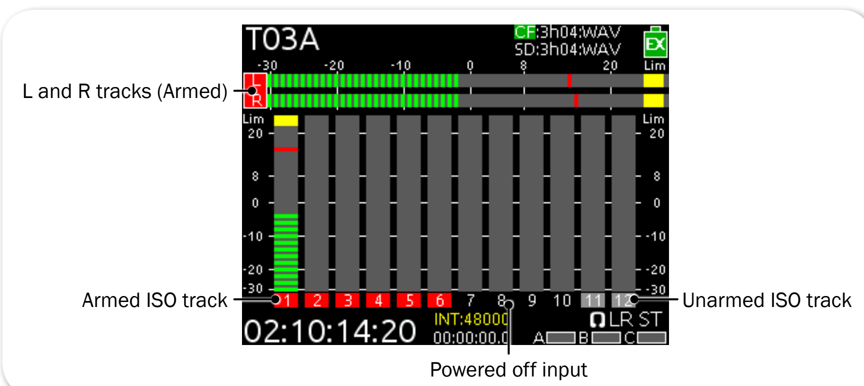


2. Press in the Transport control to stop recording.

Recording Tracks

The 688 features 16 recording tracks. Each of the 12 inputs is permanently routed to its associated ISO track. Buses L, R, X1, and X2 can also be armed for recording.

ISOs can be sent to both pre- and post- fade. X1 and X2 can record any combination of channels pre- or post-fade.



To arm or unarm a track for recording:

1. Press the METERS button repeatedly until the chosen track is visible on the Main screen.
2. Turn the SELECT encoder to move the white highlight to the chosen track.
3. METERS + SELECT: Press the METERS button and SELECT encoder together. The background color changes to indicate the track’s armed status. Red = armed, Grey = unarmed, and Black = input powered off.

ⓘ *When RECORDER > Sample Rate is set to 88.2k or higher, arming and recording*

ISO tracks 7-12 is disabled. Channels 7-12 can still be used to feed any mix bus when set to record with higher sampling rates.

Recorder Settings

The Main menu has a sub-menu of settings related to recording. These may be used to customize the configuration of the 688's Record settings.

To access the Recorder sub-menu:

1. Press the MENU button
2. Turn and press the Headphone encoder to select RECORDER.

Sub-menu	Description	Options
Record to CF	Sets the type of file and which tracks to record to the CF card. The default is Wav Poly.	• Off • Wav Poly • Wav Poly (ISOs Only) • Wav Poly (LR Only) • Wav Poly (X1X2 only) • MP3 (LR) • MP3 (X1X2) • Wav Mono • Wav Mono (ISOs only)
Record to SD	Sets the type of file and which tracks to record to the SD card. The default is Wav Poly.	• Off • Wav Poly • Wav Poly (ISOs Only) • Wav Poly (LR Only) • Wav Poly (X1X2 only) • MP3 (LR) • MP3 (X1X2) • Wav Mono • Wav Mono (ISOs only)
MP3 Bit Rate	The bit rate of recorded MP3 files. The default is 320kbs.	• 320kbs • 192kbs • 128kbs
Sample Rate	The internal sample rate and sample rate of recorded WAV files. The default is 48k.	• 44.1k • 47.952k • 47.952kF • 48k • 48.048k • 48.048kF • 88.2k • 96k • 192k
Bit Depth	The bit depth of recorded WAV files. The default is 24.	• 24 • 16

Sub-menu	Description	Options
Pre-roll Time	Adjust the amount of record time to be appended before each recording. Maximum value is 3 seconds when recording WAV Mono files to any media. Higher sample rates also limit pre-roll. Rates of 88.2 and 96k should be 3 seconds, and 192 kHz is 1 second. The default is 0 seconds.	• 0 - 6 seconds (1s increment)

File Type and Media Track Assignment

The 688 supports simultaneous recording to CF and SD media. By default, all armed tracks are recorded to both cards as a polyphonic WAV file. It is possible to record only the armed ISO tracks, only the armed L and R tracks, or only the armed X1 and X2 tracks to either media.

WAV (Broadcast WAV)

The 688 writes AES-31 broadcast WAV formatted files. The audio files created by the 688 include additional metadata in the file's header, Broadcast Audio Extension (BEXT) and iXML data chunks.

MP3

MPEG-1 Layer III is a lossy compression algorithm, often used for music and transcription recording purposes. The 688 records two-channel MP3 audio files with data rates of 128, 192, and 320 kbs. For more information, sSee MP3 Bit Rate.

ⓘ *MP3 recording is only possible when RECORDER > Sample Rate is set to 44.1k or 48k.*

To set file type and track routing:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select either of the following:
   - RECORDER > Record to CF
   - RECORDER > Record to SD
3. Turn and press the Headphone encoder to choose a file type and track assignment for the chosen media.

ⓘ *When RECORDER > Sample Rate is set to 88.2k or higher, arming and recording ISO tracks 7-12 is disabled.*

MP3 Bit Rate

The 688 records MP3 files at a default bit rate of 320kbs, but that bit rate may be changed. A high bit rate MP3 file preserves more audio information with an increased file size. A low bit rate MP3 file preserves less audio information with a decreased file size.

To change the MP3 bit rate:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select RECORDER > MP3 Bit Rate.
3. Turn and press the Headphone encoder to select a bit rate. Options include: 128, 192, and 320 kbs.

Sample Rate

The 688 records WAV files at 48 kHz sample rate by default.

To set sample rate:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select RECORDER > Sample Rate.
3. Turn and press the Headphone encoder to select a sample rate. Options include: 44.1k, 47.952k, 47.952kF, 48k, 48.048k, 48.048kF, 88.2k, 96k, and 192k.

   The sample rate value is stored in file metadata. Those options with “F” are F mode rates. The F stands for “faux” or “Fostex”.

F Sample Modes

The 48.048kF mode is used in specific work flows with Avid®, Final Cut Pro®, and other post-production environments that do not recognize audio files written at 48.048 kHz. In this mode files are recorded at a 48.048 kHz sampling rate but are stamped at 48 kHz. When played, they will play back 0.1% slower than real time.

One use for the 48.048kF mode is to force a 0.1% speed reduction (pull down) of audio to match MOS-telecined film (24 fps-to-NTSC) in non-linear edit systems, such as Avid or Final Cut Pro. Since the file is stamped as a 48 kHz file, the edit system will play it back at 48 kHz and not at 48.048 kHz. This “audio pull down” will match the transferred picture without the need for an intermediate step through other software to create the pull down.

When using 48.048kF sample rate, set main menu option TIMECODE > Frame Rate to 30ND or 24. When set to 30ND, files will be stamped with a frame rate of 29.97. When set to 24, files will be stamped with a frame rate of 23.97ND.

Both 47.952 and 47.952kF settings use a record sampling rate of 47.952 kHz, 0.1% lower than 48 kHz. The 47.952kF mode, however, identifies the file as being recorded at 48 kHz.

When using 47.952kF sample rate, set main menu option TIMECODE > Frame Rate to 23.97ND or 29.97ND. When set to 23.97ND, files will be stamped with a frame rate of 24. When set to 29.97ND, files will be stamped with a frame rate of 30ND.

ⓘ *MP3 recording is not allowed in “F mode”.*

Bit Depth

The 688 records 24 bit WAV files by default. Bit depth defines the digital word length used to represent a given sample and correlates to the maximum dynamic range that is represented by the digital signal. Larger bit depths accommodate a wide dynamic range.

To set bit depth:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select RECORDER > Bit Depth.
3. Turn and press the Headphone encoder to select 24 or 16.

ⓘ *The bit depth value is stored in file metadata.*

Pre-roll

By default, the pre-roll time is 0 seconds (off). When active, pre-roll begins recording at a set number of seconds preceding the record button being pressed.

To set pre-roll time:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select RECORDER > Pre-roll Time.
3. Turn and press the Headphone encoder to select a value (0 s to 6 s).

ⓘ *Pre-Roll is disabled when the timecode mode is set to Record Run, External Timecode Auto Record, or External Timecode Continuous Auto Record. This prevents possible overlapping timecode numbers between adjacent files.*

Maximum pre-roll time is 3 seconds when RECORDER > Sample Rate is set to 88.2k or 96k.

Maximum pre-roll time is 1 second when RECORDER > Sample Rate is set to 192k.

Slate Microphone

The 688’s built-in slate and external microphone is used to notate scenes from the mixer location. Its audio performance is not suitable for critical recording applications. It should be used for documenting scenes and for communication purposes only.

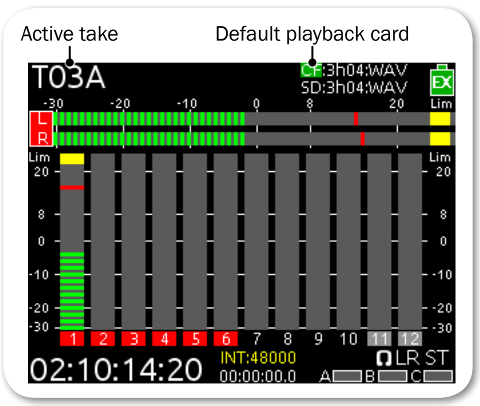
To use the slate microphone:

1. Slide the MIC/TONE switch left to activate the slate mic. The Slate/Tone LED illuminates green to indicate the slate mic is active.
2. Slide the MIC/TONE switch left again to deactivate the slate mic.

ⓘ *By default, the slate mic is routed to all tracks and outputs. The gain of the slate mic can be adjusted and an external mic can be used optionally.*

Playback

Playback may be initiated at any time except when the 688 is recording. Unless playback is initiated from the Take List or File List, the active take will be played. The active take is whichever take was recorded or played most recently. The active take is displayed at the top of the Main screen.



To play back the active take:

- Push the Transport control down in any view beside the File List or Take List.
- To play back a specific file from the Take List or File List, push the Transport control down while a file is highlighted in one of those views.

Comms and Returns

The 688 is equipped with three stereo returns (RTN A, B, C) which allow the Sound Mixer to hear Camera audio directly from the 688 interface to ensure quality audio is being sent to camera. RTN audio can be quickly monitored on the 688 headphone output with a toggle of the RTN/FAV switch. The 688 can utilize an external slate mic or the built-in slate mic for an “all call” (Slate) to any of its outputs or record tracks. The Slate mic can also be used to send private communications (COM) to any of the six Aux outputs.

This section discusses the flexible options and setup of the returns and communication systems.

Topics in this section include:

Overview of Slate Mic

The slate microphone can be used to audibly identify a scene or slate at the start of recording or communicate with other members of the production crew. The 688 incorporates a built-in slate mic and a port for an external slate mic. The built-in mic is the default. Its audio performance is not suitable for critical recording applications; it should be used for documenting scenes and for communication purposes only. Use an external slate mic when higher quality communications are required.

Using the Slate for Notation

To activate the slate function momentarily:

1. Slide and hold the MIC/TONE switch left. The slate mic will activate, the Slate/Tone LED will illuminate green, and the headphone monitor source will change to SLATE while the switch is held.
2. Release the MIC/TONE switch. The slate mic will deactivate, the Slate/Tone LED will turn off, and the headphone monitor will revert to its previous source.

To lock the slate function on:

1. Slide the MIC/TONE switch left. The slate mic will activate, the Slate/Tone LED will illuminate green, and the headphone monitor source will change to SLATE.
2. Slide the MIC/TONE switch left again. The slate mic will deactivate, the Slate/Tone LED will turn off, and the headphone monitor will revert to its previous source.

Using Private Comms

The 688 features Comms for quick communication between the 688 operator and other members of the crew. The most common use of Comms is for the sound mixer to communicate with his or her boom operator.

Activating the Comms

When Comms are active, the slate mic will activate and that signal will be sent to auxiliary outputs which have the Com send source activated. Additionally, the headphone monitor source will change to COM to monitor slate signal in the right headphone channel.

To activate Comms momentarily:

1. Press and hold the SELECT encoder + Slide and hold the MIC/TONE switch left. The slate mic will activate, the Slate/Tone LED will illuminate green, and the headphone monitor source will change to COM while the switch is held.
2. Release the MIC/TONE switch. The slate mic will deactivate, the Slate/Tone LED will turn off, and the headphone monitor will revert to its previous source.

To lock Comms on:

1. Press and hold the SELECT encoder + Slide the MIC/TONE switch left. The slate mic will activate, the Slate/Tone LED will illuminate green, and the headphone monitor source will change to COM.
2. Slide the MIC/TONE switch left again. The slate mic will deactivate, the Slate/Tone LED will turn off, and the headphone monitor will revert to its previous source.

Monitoring COM/RTN

Signal from the COM/RTN input can be monitored for two-way communication while Comms are active.

To monitor COM/RTN:

1. Press and hold the SELECT encoder + Slide the RTN/FAV switch left. The headphone monitor source will change to COM RTN.
2. Slide the RTN/FAV switch right to set monitor source to the previous setting.

Routing Com Sends

The com send source can be assigned to any of the auxiliary outputs (X1 - X6). Com send sources are assigned in the Aux Output Routing screens.

Comms / Returns Settings

Sub-menu	Description	Options
Slate/Com Mic Source	Select internal or external slate microphone. Use Ext 12V setting for external condenser microphones.	• OFF • Int Mic • Ext Mic • Ext 15V Mic
Slate/Com Mic Gain	Sets the input gain for external and internal slate microphone.	• 0-36 dB (1 dB increment)
Slate Routing	Select which tracks and outputs the slate mic signal is routed to.	
Com Return Gain	Sets the input gain of the COM RTN input.	• 0-24 dB (1 dB increment)
COM Mutes Output Program	Toggle automatic muting of COM Program when COM communication is activated.	• Yes • No
MIC Switch Action	Selects primary and secondary function of the MIC/TONE Switch.	• Disabled • Slate • Com
RTN Switch Action	Selects primary and secondary function of the left side of the RTN/FAV Switch.	• No Action • RTN A • RTN B • RTN C • Com RTN • FAV-Headphone
FAV Switch Action	Selects primary and secondary function of the right side of the RTN/FAV Switch.	• No Action • RTN A • RTN B • RTN C • Com RTN • FAV-Headphone

Setting up an External Slate Microphone

An external microphone can be used instead of the built-in microphone.

To set up an external slate microphone:

1. Connect the microphone to the SLATE MIC IN TA3 connector on the left

panel.

2. Press the MENU button.
3. Turn and press the Headphone encoder to select COMMS/RETURNS > Slate/ Com Mic Source.
4. Turn and press the Headphone encoder to select Ext Mic (for dynamic microphones) or Ext 15V Mic (for condenser microphones). When the slate function is active, the 688 will now use this microphone for signal.

Setting Slate Mic Gain

The gain of the slate mic is 36 dB by default. If this gain is too high, it can be adjusted:

To adjust slate microphone gain:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select COMMS/RETURNS > Slate/ Com Mic Gain.
3. Turn the Headphone encoder to adjust slate microphone gain (0 dB - 36 dB).

ⓘ *For quick adjustment of slate microphone gain, slide the MIC/TONE switch to the left and hold while turn the Headphone encoder.*

Timecode and Sync

The 688 features a fully-integrated Ambient™ timecode generator and reader that supports all common rates and modes. The 688 holds accurate timecode for up to two hours after shutdown, using its own internal, Lithium-Ion timecode battery. This timecode battery is charged whenever the 688 is powered on.

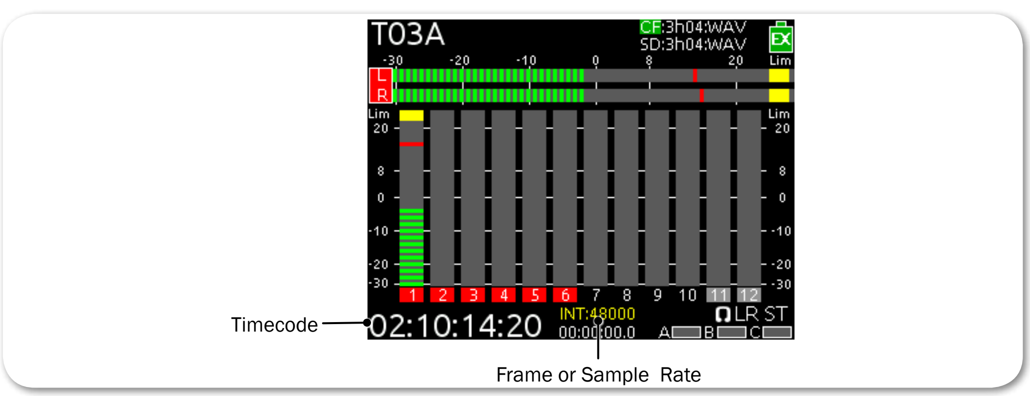
ⓘ *After two hours without power, the 688 reverts to a slightly less-precise time-of-day crystal to maintain the date and time on the device.*

Word Clock connectors on the back panel allow the 688 to be sample synchronized with other digital audio equipment in the work flow.

Topics in this section include:

Timecode

File-based recorders place a timecode and frame rate stamp in the BEXT and iXML chunks of an AES31 Broadcast WAV file. During playback, the mixer generates SMPTE timecode from this number and extrapolates it based on the timecode frame rate. All files generated by the mixer have timecode numbers that begin on the 0 frame (or 02 in DF modes) and end on the 0 frame such that a file’s duration is always an integer number of seconds long. If necessary, pre-roll and post-roll is dynamically applied to accomplish this, simplifying synchronization in post-production. The timecode value and frame rate of the 688 are displayed on the Main screen.



ⓘ *If sample rate is displayed–as shown–instead of the frame rate, toggle the view to frame rate by holding METERS down and slide the RTN/FAV switch to the left.*

Setting the Timecode Mode

The Timecode mode determines if the mixer generates or reads timecode from an external source, and when timecode runs and stops.

To set the Timecode mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Timecode Mode.
3. Select a mode. Options include:

Options	Mode Type	Description
Off	N/A	Turns timecode mode off.
Rec Run	Generator	Timecode runs while recording and is stationary when not recording. In this mode, timecode defaults to the last stationary value at power-up. When switching to Record Run from another mode, the internal generator will stop at the last timecode value.
Free Run	Generator	Timecode runs continuously. Timecode continues counting for up to two hours after power-down.
Free Run Auto Mute	Generator	Timecode runs continuously; however, timecode output is muted during standby. This is useful for triggering external devices when in free run timecode workflows.
Free Run Jam Once	Generator	Allows the mixer to automatically jam to an external valid timecode source when first connected. Once jammed, the mixer will retain the timecode count even when disconnected from external source and for up to two hours after the mixer is powered down.
24h Run	Generator	Timecode runs continuously with its value based on the mixer's time and date settings. This is useful for workflows requiring timecode be referenced to the Actual Time clock.
24h Run Auto Mute	Generator	Timecode runs continuously with its value based on mixer's time and date settings; however, timecode output is muted during standby.
Ext-TC	Reader	Timecode is derived from external timecode sources.
Ext-TC Auto-Rec	Reader	Timecode is based on external timecode sources, and allows recording on the 688 to be triggered via external timecode starting and stopping.
Ext-TC/Cont	Reader/ Generator	Timecode is based on external timecode sources. If timecode is disconnected, the 688 continues counting from the same value, using its internal timecode generator. This is useful when working with wireless timecode sources, allowing the mixer to free-wheel through wireless dropouts.

Options	Mode Type	Description
Ext-TC Auto-Rec/Cont	Reader/ Generator	Timecode is based on external timecode sources, and allows recording on the 688 to be triggered via external timecode starting and stopping. Also, if timecode is disconnected, the 688 continues counting from the same value, using its internal timecode generator. This is useful when working with wireless timecode sources, allowing the mixer to free-wheel through wireless dropouts. In the event of a dropout, the 688 will stop recording when it receives a stationary value.

Setting the Frame Rate

By default, the 688's frame rate for the timecode generator is set to 30nd.

ⓘ *The frame rate value is stored in the Frame Rate field of metadata.*

When using an external timecode mode, ensure the mixer's frame rate is equal to (or cross-jam compatible to) the external frame rate.

To set frame rate for the timecode generator:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Frame Rate. Options include: 23.98, 24, 25, 29.97nd, 29.97df, 30nd and 30df.

Setting Timecode Hold Off

Some devices that send Rec-Run timecode will have a tendency to occasionally send short bursts of running or invalid timecode. When using these devices as an external timecode to trigger recording, this behavior can result in unintentional recordings or invalid timecode stamps on the mixer. To prevent this, the 688 features a Timecode Hold Off function.

This feature only applies when in Ext-TC Auto-Rec and Ext-TC Auto-Rec/Cont timecode modes.

When using these external timecode auto-record modes, the 688 will delay the start of recording for a specified "hold" time. Running timecode that lasts for less than the Hold Off value will not trigger a recording on the 688.

To set up Timecode Hold Off:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Hold Off.
3. Specify the hold time in 0.1 second intervals. Options include: 0.0 s - 8.0 s.

ⓘ *If Pre-Roll is set, it will be applied. Pre-Roll will only capture audio from the initial detection of a timecode signal. If no Pre-Roll is selected, the file will begin after the Hold Off time expires. It is best practice to set Pre-Roll to a value greater than the specified Hold Off value. This ensures that audio is captured from the moment a timecode signal is detected and that unintentional files triggered by short bursts of timecode are not generated.*

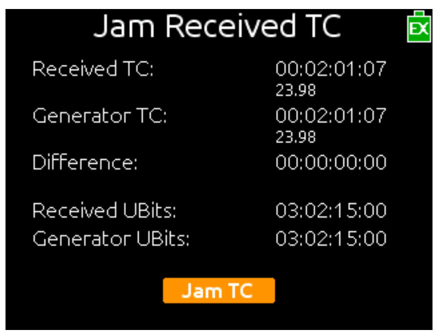
Jamming the Timecode

The Jam Received TC screen (better known as the Timecode Jam menu) displays detailed information about the mixer’s internal SMPTE timecode generator and SMPTE timecode present on the mixer’s timecode input. It also features a button allowing you to jam the timecode if necessary.

If the mixer’s time and date are reset during the production day, or if the Timecode mode is changed from 24h Run to another mode and back, the timecode value will change. To ensure proper synchronization, you must re-jam all timecode devices.

To access the Timecode Jam menu, do one of the following:

- ▶ Press METERS + MIC.
- ▶ Press MENU, and then use the Headphone encoder to select TIMECODE/SYNC > Jam Menu.



To manually jam the timecode:

- ▶ From the Timecode Jam menu, press the Headphone encoder.

To exit the Timecode Jam menu without jamming:

- ▶ Press either the MENU or METERS button.

Setting the Timecode Generator

Timecode values may also be manually set.

To set the timecode generator:

1. Press the MENU button.

2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Set Generator TC.

   The Set Generator TC screen appears with four fields representing hours (HH), minutes (MM), seconds (SS), and frames (FF).

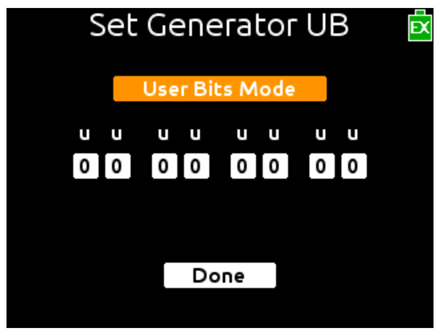
3. Navigate the screen's fields by doing the following:
   - Turn the encoder to move orange highlight from one field to the next.
   - Press the encoder to select a field. Chosen fields appear blue.

4. Turn and press the encoder to change each field's value.

5. When finished with your edits, turn the encoder to highlight Done and press the encoder to save your new timecode value.

Setting User Bits

By default, you may customize the user bits with a four-field format, delineated by colons, such as UU:UU:UU:UU, where U represented a user-definable value.



Often, the first three fields in the format are manually reset daily using two-digit numerical values for the date, such as MM:DD:YY:UU.

The User Bits mode lets you configure the device to automatically populate the first three fields with values derived from the system's date.

To set User Bits mode:

1. Press the MENU button.

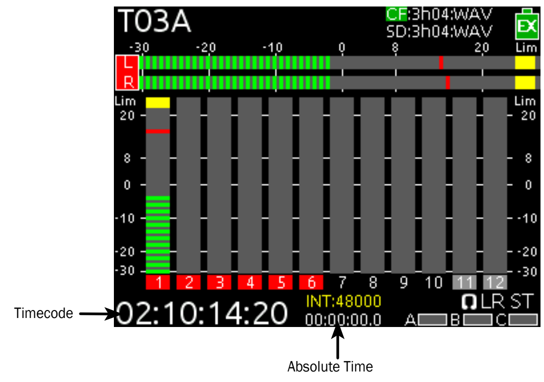
2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Set Generator UBits.

3. Press the encoder again to select one of three mode options:
   - UU:UU:UU:UU — four, two-digit, user-definable fields (the default)
   - MM:DD:YY:UU — first three two-digit fields represent month, day, year
   - DD:MM:YY:UU — first three two-digit fields represent day, month, year

When set to MM:DD:YY:UU or DD:MM:YY:UU, the system will populate the first three fields, so those fields will appear grayed out in the Set Generator UB screen, leaving only the last field (UU) to be customized by the user.

Setting Display Mode

By default, the timecode is displayed as the largest clock on the screen in meter views. However, you may reverse the positioning of the timecode and absolute time clocks on all meter views so that the one you deem most important is larger.



To reverse the clock display:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select TIMECODE/SYNC > Display Mode. Options include:

Options	Description
Big A-time	Displays absolute time as the larger clock in all Meter Views.
Big Timecode	Displays the timecode as the larger clock in all Meter Views.

Word Clock In & Out

By default, the 688 uses its own internal clock to generate its sampling rate.

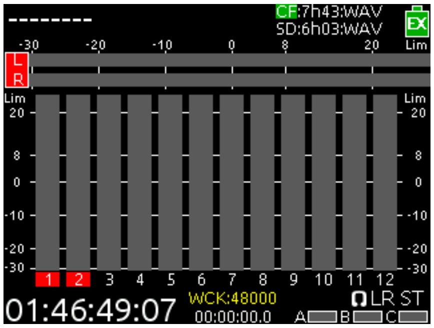
The Word Clock BNC input connection on the back panel may be used to clock from an external signal. The 688 internal word clock may also be used as clock master by connecting its output connection to external audio devices.

ⓘ *The 688 accepts word clock signals between 44.1 kHz and 192 kHz.*

To synchronize to an external word clock signal:

1. Connect the word clock signal to the BNC input on the 688's back panel.
2. Press the MENU button.
3. Turn and press the Headphone encoder to select TIMECODE/SYNC > Sync Reference.
4. Set the sync reference to Word Clock.

When the 688 is locked to external word clock, it is indicated by WCK in yellow text at the bottom of the Main screen.



If no valid external word clock is present, the word UNLOCK blinks yellow and red on the Main screen.

Word Clock Sensitivity

A menu option is available on the 688 letting you adjust the sensitivity of the word clock input to allow the mixer to work with word clock sources of lower voltage amplitude.

To set the sensitivity:

1. Press the MENU button.
2. Select the Timecode/Sync > Word Clock In Termination. Options include: Off or 75 Ohm. By default, sensitivity is set to Off.

File Storage

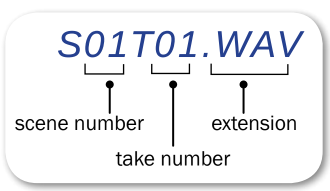
The 688 has multiple options for file management of the SD and CF cards. In this chapter we discuss the file and folder structure, copying files from one media to another, transferring files from the CF or SD card to a computer, formatting media and generating CSV Sound Reports directly from the 688 interface.

Topics in this section include:

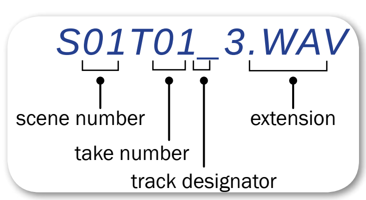
File Structure

The 688 records polyphonic or monophonic audio files. Polyphonic recordings have multiple audio tracks within a single file. Monophonic recordings have a file for each audio track.

Polyphonic file names consist of a scene name, take number, and a file extension:



Monophonic file names consist of a scene name, take number, mono track designator, and a file extension:



The track designators are associated with the 688 tracks. This differs from track names which may be edited and are covered in depth in the Metadata section of this guide.

This table illustrates the association between 688 tracks, track names, and track designators.

Track L	MixL	1
Track R	MixR	2
Track 1	Ch1	3
Track 2	Ch2	4
Track 3	Ch3	5
Track 4	Ch4	6
Track 5	Ch5	7
Track 6	Ch6	8
Track 7	Ch7	9
Track 8	Ch8	A
Track 9	Ch9	B
Track 10	Ch10	C
Track 11	Ch11	D
Track 12	Ch12	E
Track X1	Aux1	F
Track X2	Aux2	G

Transferring Files to PC

When finished recording, and the media remaining time on the Main screen is white, you may remove the SD or CF card(s) from the 688 and mount them to any computer and transfer your recorded files using a card reader or card slot.

To remove the SD card:

1. Open the Media Door.
2. Push it in to release the card, and then pull it out.

To remove the CF card:

▶ Open the Media Door and pull out the card.

To transfer files:

1. Mount your memory card to your computer.
2. Copy the files from the card to the computer.

ⓘ *Sound Devices recommends that you copy files first before editing files on the computer. Do not edit files directly from the memory cards.*

Take List and File List

A file is an individual file stored on attached media. A take is a single recording that can consist of multiple files on one or both media. The Take List displays a list of takes and provides functions for deleting, renaming, and editing of metadata fields. Edits made in the Take List will be applied to both SD and CF cards, if applicable.

Accessing the File List

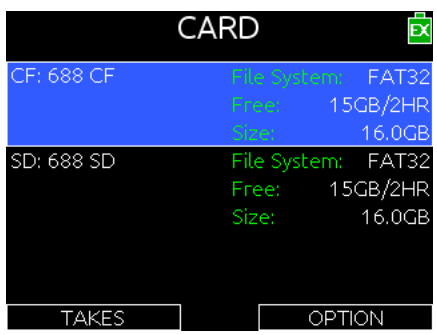
The File List displays files and folders on a chosen media and provides functions for deleting files or folders, copying files or folders to other media, renaming folders, creating sound reports, formatting media, and emptying Trash and False Take folders. The File List functions only apply to the chosen media.

To access the File List:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > File List.

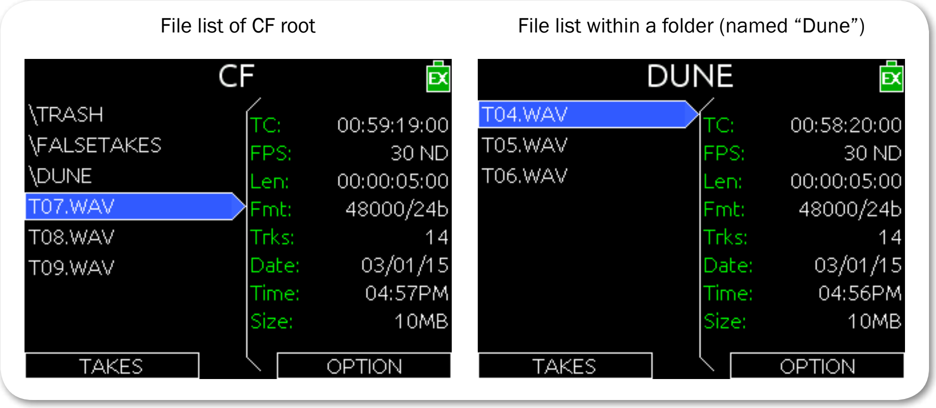
ⓘ *An alternative way to access the File List is by sliding the MIC/TONE switch while the Take List screen is displayed. That switch acts as a toggle between the File List and Take List screens.*

The first screen displays each media and general information along with menu options.



3. Slide the RTN/FAV switch to access options for the card. Options include:
   - Create Sound Report
   - Copy to other card
   - Rename
   - Empty Trash
   - Erase/Format

   In necessary, to return to the Card screen, press MENU.
4. Turn and press the Headphone encoder to select CF or SD and view its contents. A list of files on that card will be displayed. Folder names are preceded by a slash ("\").



5. Turn the Headphone encoder to highlight a chosen file or folder. Information pertaining to your selection appears on the right.
6. Slide the RTN/FAV switch to access options. The OPTION menu will vary depending on the file or folder selected.

   Folder options include:

   - Create Sound Report
   - Empty Folder (Trash and False Takes folders only)
   - Copy Directory to other card
   - Rename Folder
   - Delete folder from chosen card

   File options include:

   - Copy file to the other card
   - Delete file from chosen media

Deleting Files or Folders

Files and folders can be deleted from the File List.

ⓘ *File deletion applies only to the chosen media. To delete all files associated with a take, use the Take List.*

To delete a file or folder:

1. From the File List, turn and press the Headphone encoder to select CF or SD. A list of files on that card will be displayed.
2. Turn the Headphone encoder to highlight the chosen file or folder.
3. Slide the RTN/FAV switch left or right to access options for the highlighted file or folder.
4. Turn and press the Headphone encoder to select Delete.
5. Press the Headphone encoder to confirm deletion or turn and press the Headphone encoder to cancel deletion.

   Deleted files get moved to the Trash folder of the chosen card.

File Storage Settings

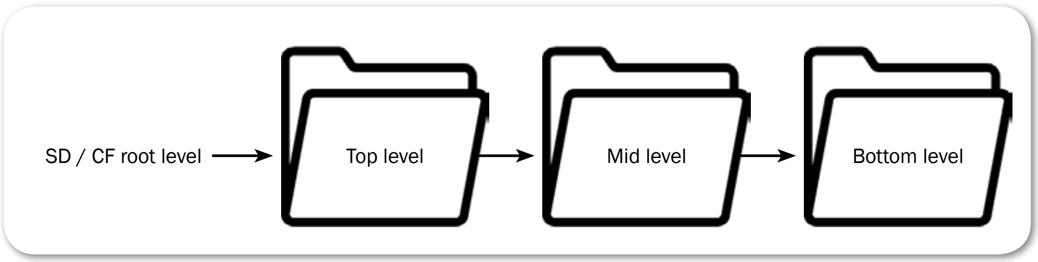
The following table provides the File Storage settings and available options.

Sub-menu	Description	Options
Take List	Accesses the Take List	
File List	Accesses the File List	
Folder Options	Sets options for folder structure with up to three levels of hierarchy.	• Top-Level • Mid-Level • Bottom-Level
Sound Report Info	Enter information to be included in Sound Report headers.	• Project • Producer • Director • Job • Date • Location • Sound Mixer • Phone • E-Mail • Client • Boom Op • Prod. Co. • Prod. Co. Tel. • Mics • Comments • Roll • Media • File Type (CF) • File Type (SD) • Sample Rate • Frame Rate • Bit Depth • Tone Level
File Max Size	Selects the file size at which a recording will close automatically, and then start a new file.	• 4GB • 2GB • 1GB • 640MB • 512MB
Scene Increment Mode	Enables or disabled the scene increment shortcut and selects which format the scene increment will use.	• Disabled • Character • Numeric
Take Reset Mode	Defines when take number is reset.	• Never • Scene Change • Daily Folder Change • Either Scene or Daily
File Playback Mode	Determines what (If any) playback action the 688 will perform upon reaching the end of a file during playback.	• Play Once • Play All • Repeat One • Repeat All
Default Playback Card	The source media that files will be played from when playback is initiated.	• CF • SD

Sub-menu	**Description**	**Options**
Erase/Format CF	Formats CF card to FAT32 (32 GB or less) or exFAT (greater than 32 GB) file system.	
Erase/Format SD	Formats SD card to FAT32 (32 GB or less) or exFAT (greater than 32 GB) file system.	

Setting Folder Options

By default, recorded files are written to the root level of the SD and CF card. Three levels of directories can be configured from Main menu option FILE STORAGE > Folder Options. Folder choices include Top-Level, Mid-Level, and Bottom-Level. Folders are created when the record key is pressed.



Each folder level has a corresponding list of available names that can be edited manually. When a folder level is manually named, all subsequent recordings will be written to that folder until the Folder option is changed.

To manually set the name of a folder level:

1. Press the MENU button to access the Main menu.
2. Turn and press the Headphone encoder to select FILE STORAGE > Folder Options.
3. Turn and press the Headphone encoder to select a folder level. Options include: Top-level, Mid-level, or Bottom-level.
4. Turn and press the Headphone encoder to select <Add New Entry>.
5. Use the on-screen keyboard (or an USB keyboard, if attached) to enter a value.
6. (Optional) If you mistype while entering a value, slide the RTN/FAV switch left to "backspace" and remove the mistyped text.
7. Slide the RTN/FAV switch right to accept the new value.

In addition to custom entries, the Mid-level folder may be set to <Daily> and the Bottom-level folder may be set to Scene:

- When the Mid-level folder is set to <Daily>, a folder will be created automatically and named according to the date. Whenever a new day occurs, the 688 will prompt the user to confirm the creation of a new daily folder.
- When the Bottom-level folder is set to <Scene>, a new folder will be creat-

ed each time the scene name is changed.

ⓘ *The top level folder value is stored in the Project field of metadata.*

The mid level folder value is stored in the Roll (Tape) field of metadata.

Generating Sound Reports

The 688 can generate sound reports as a comma separated values (CSV) file. CSV files can be opened and edited by any common spreadsheet application such as Microsoft® Excel®, OpenOffice™ Calc, Apple® Numbers, Google Docs™, and many more. Ensure the spreadsheet application is set to delineate by comma.

ⓘ *MP3 files are not included in Sound reports.*

To define headers for sound reports:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > Sound Report Info. A list of sound report headers appears.
3. Select a header to edit.
4. Do one of the following:
   - Use the Headphone encoder to select an existing item from the list.
   - Use the Headphone encoder to select <Add New Entry>. Then use the on-screen keyboard to enter a new value.

ⓘ *Other options include: <None>, <Current Selection>, and <System Date>.*

Sound reports are generated by folder. All files in the folder are included in the sound report. Files located within sub-folders will not be included in the sound report. For example, if you have a Mid- and Bottom-level folder, you have to create a sound report on the bottom level where the files are located.

To generate a sound report:

1. Access the File List. See *Accessing the File List* for details.
2. Turn the Headphone encoder to highlight the folder in which you would like to generate a sound report.
3. Slide the RTN/FAV switch right to access the options menu for this folder.
4. Turn and press the Headphone encoder to select Create a Sound Report. A .csv file will be created in the folder with a name of: [FOLDER NAME]_REPORT.CSV.
5. When prompted for confirmation, press the Headphone encoder to confirm.

Defining File Max Size

By default, the maximum size of WAV files is 4GB. When the max file size is reached, the file is split and a new file is written automatically. This split is seamless and sample-accurate.

To set maximum file size:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > File Max Size.
3. Turn and press the Headphone encoder to set a maximum file size.

If longer recording times with less splits are wanted, various options affect this:

- Record mono WAV files rather than poly WAV files
- Lower the Sample rate
- Lower the amount of armed tracks (poly only)

Setting Scene Increment Mode

The 688 provides a Scene Name Increment shortcut, but it is disabled by default. Scene names will not increment unless the Scene Increment mode is enabled.

To enable Scene Increment mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > Scene Increment Mode. Options include: Disabled, Character, or Numeric.

   After Character or Numeric is chosen, then the scene name increment shortcut is enabled.

ⓘ *When the Scene Name Increment shortcut is used, if the current scene name ends in a letter or number, that letter or number will be incremented. If the current scene name does not end in a number or letter, a "1" or "A" will be added.*

Setting Take Reset Mode

By default, take numbers will reset when a new scene is selected or when a new daily folder is created. This behavior can be modified to only happen when the daily folder changes, only happen when the scene changes, or to never happen at all.

To set take reset mode:

1. Press the MENU button.

2. Turn and press the Headphone encoder to select FILE STORAGE > Take Reset Mode. Options include: Never, Scene Change, Daily Folder Change, or Either Scene or Daily.

File Playback Mode

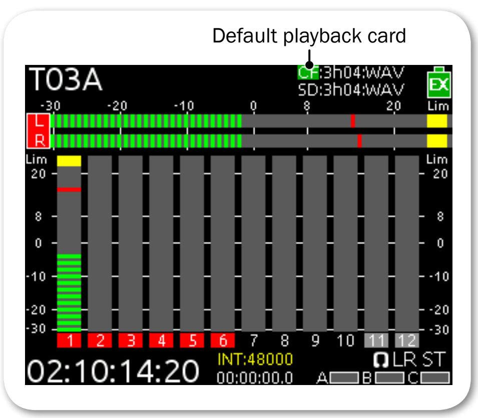
When playback is initiated, the selected file will play to the end and then stop—unless, of course, playback is stopped prematurely by manually pressing the Transport control down twice. This default behavior is called Play Once, but it may be modified so that all files in the folder will be played (Play All), the selected file will play in a loop until stopped (Repeat One), or all files in the folder will be played in a loop until manually stopped (Repeat All).

To set file playback mode:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > File Playback Mode. Options include: Play Once, Play All, Repeat One, or Repeat All.

Selecting a Default Playback Card

By default, playback will target the file residing on the CF card. If no CF card is present, the SD card will be used. The default playback card is indicated with a green background on the main view:



To set the default playback card:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > Default Playback Card. Options include: CF or SD

Erase / Format Media

Before recording to CF or SD media, cards must be formatted.

To format media:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE.
3. Do either of the following:
   - Select Erase/Format CF to reformat a CompactFlash card.
   - Select Erase/Format SD to reformat an SD, SDHC, or SDXC card.
4. Press the Headphone encoder to begin the formatting process.

⚠ ***Formatting media will erase all data on the card.***

5. Follow the message(s) that appear on screen and press the Headphone encoder to continue.
6. Press the METERS button to return to the Main screen.

Cards with a capacity of 32 GB or less will be formatted with the FAT32 file system. Cards with a capacity greater than 32 GB will be formatted with the exFAT file system.

ⓘ *The exFAT file system is not compatible with Windows XP or Mac OS X 10.6.4 or lower.*

Metadata and Take List

Metadata is used to convey the details or content of a recording. A take can consist of multiple metadata files.

The 688 Take List allows the sound mixer to enter and edit the metadata of broadcast WAV files, such as Scene, Take, Notes, Track Names, and Circle Status.

Applications that can read Bext and iXML data will display the metadata of files generated by the 688. Metadata can also be used to generate a Sound Report in CSV file format directly from the 688.

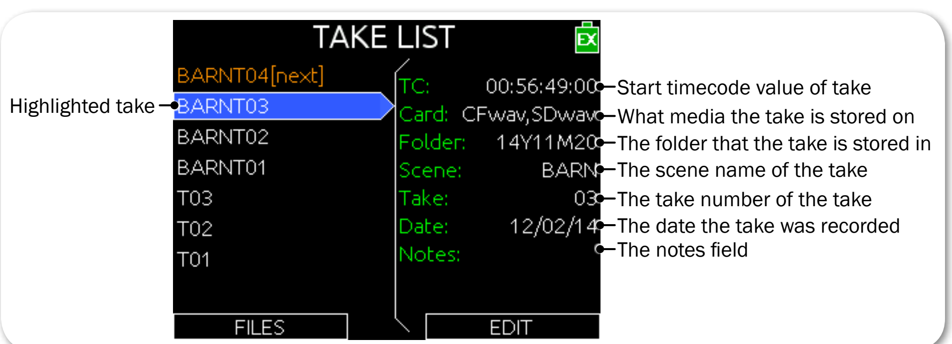
Topics in this section include:

Take List Overview

The Take List displays all tracks recorded across both media.

By default, when a recording is made, the name of the file is the take number, such as T01.wav. From the Take List, a user can enter a scene name for the next take so that when the recording occurs, the file name contains both scene and take.

In the Take List screen, takes are listed in the left column in the order they were recorded. The top item in orange text indicates the next take. The right column displays details about the highlighted take.



In the example, the highlighted take is known as the current take. Edits made to the current take will be applied to the next take and subsequent recordings that follow. Previous takes are listed below the current take.

Accessing the Take List

There are two ways to access the Take List. One way is via the Main menu's FILE STORAGE sub-menu. The other is provided in the following procedure.

To access the Take List:

1. MENU + HP: Press and hold the MENU button and Headphone encoder.

   The Take List screen appears.
2. Turn the Headphone encoder to highlight takes and view details in the right column.
3. Press the METERS button to exit or close the Take List screen.

Playing Takes

Playback of a take may be initiated from the Take List.

To play a take from the Take List:

1. MENU + HP: Press in the MENU button and Headphone encoder together to view the Take List screen.
2. Turn the Headphone encoder to highlight a take to play.
3. Push down the Transport control to begin playback. The Main screen is displayed, and playback begins.

Editing Metadata on the 688

Notes, Scene, Take, Circle Status, Folder (tape), Project, and all track names may be edited directly from the Take List for next or previous takes.

ⓘ *The term "file" refers to a single file on one medium, but the term "take" refers to a recording which may consist of multiple files with identical content on different media. Editing a take in any way will affect all files associated with that take.*

To edit metadata from the Take List:

1. MENU + HP: Press and hold the MENU button + Headphone encoder together to view the Take List screen.
2. Turn and press the Headphone encoder to choose a take to edit. A list of metadata parameters appears.

   ⓘ *Selecting the take at the top of the list (Orange text and indicated by [NEXT]) will set metadata value for future takes. Selecting any other takes in the list will edit metadata for existing takes.*
3. Turn and press the Headphone encoder to choose what metadata to edit.

4. Some parameters are text-based, numeric-based, or a list of options. When editing, do one of the following:
   - ▶ For text fields, use the on-screen keyboard (or an optional USB keyboard if attached) to enter text. When finished, slide the RTN/FAV switch right to accept the value.
   - ▶ For numeric fields, use the Headphone encoder to edit the value. When finished, select Done.
   - ▶ For list fields, use the Headphone encoder to select a value.

Metadata Overview

On the 688 broadcast WAV files include iXML data and bEXT chunk data. For applications that don't recognize bEXT or iXML, this information is ignored. The following chart details the supported metadata parameters.

Metadata Parameter	Stored in	Set by (U = User, M = Machine)
Project	iXML	U; FILE STORAGE > Folder Options > Top-Level or Take List
Roll (Tape)	iXML, bEXT	M; uses creation date or is overridden by User U; FILE STORAGE > Folder Options > Mid-Level or Take List
Scene	iXML, bEXT	U; Take List
Take	iXML, bEXT	M or U; Take List
Notes	iXML, bEXT	U; Take List
Circle Take	iXML	U; Take List
File UID	iXML	M; Unique File Identifier
File Sample Rate	iXML, FMT	U; RECORDER > Sample Rate
Digitizer Sample Rate	iXML	U; Actual sample rate of AD converter
Bit Depth	iXML, FMT	U; RECORDER > Bit Depth menu
Channels	iXML, FMT	U; Number of channels (tracks) in the file
Frame Rate	iXML, bEXT	U; TIMECODE/SYNC > Frame Rate
TC Flag (ND or NDF)	iXML, bEXT	U; TIMECODE/SYNC > Frame Rate
Start Time Code	iXML, bEXT	M; Stored as a sample count since midnight
Duration		M
U-Bits	iXML, bEXT	U; TIMECODE/SYNC > Set Generator UBits
Time Code Sample Rate	iXML	M
Channel Index	iXML	M; Track Number
Interleave Index	iXML	M
Track Name	iXML, bEXT	U; Take List
Master Speed	iXML	M
Current Speed	iXML	M
Speed Note	iXML	M
Originator	bEXT	M
Creation Date	bEXT	M
Creation Time	bEXT	M

Metadata Parameter	Stored in	Set by (U = User, M = Machine)
Originator Reference	bEXT	M
Software Version	bEXT	M
Family UID	iXML	M; shared by files belonging to the same take
Total Files	iXML	M; number of files representing a take
File Set Index	iXML	M
Original File Name	iXML	M

Metadata is included in MP3 files inside the ID3 tags. Metadata in MP3 files can not be edited with the 664. The following table shows the ID3 fields that metadata is stored in and the format in which it is stored.

ⓘ *Square brackets denote variables and are not included in actual metadata.*

ID3 Field	Format
Artist Name	TC=[HH:MM:SS:FF]
Track Title	SC=[scene name] TK=[take number]
Album Title	FR=[frame rate] D=[duration]

Renaming or Deleting Previous Takes

Previous takes can be renamed or deleted from the Take List. When a take is renamed or deleted, the action applies to all files associated with that take on both media.

To rename a take:

1. MENU + HP: Press in the MENU button and Headphone encoder together to view the Take List screen.
2. Turn the Headphone encoder to choose a take from the list. This does not apply to Next takes.
3. Turn and press the Headphone encoder to select Rename. Enter a value using the on-screen keyboard or an optional USB keyboard, if attached.
4. When finished, slide the RTN/FAV switch right or press Enter on the attached USB keyboard.

To delete a take:

1. MENU + HP: Press in the MENU button and Headphone encoder together to view the Take List screen.
2. Turn and press the Headphone encoder to choose a take to delete.
3. Turn and press the Headphone encoder to select Delete.
4. Press the Headphone encoder to confirm deletion (OK).

ⓘ *Turn and press the Headphone encoder to select Cancel should you want to exit without deleting the take.*

Editing Metadata in Other Programs

Since Sound Devices recorders write metadata to WAV files using the Broadcast Wave File standard, many professional applications can read and edit this metadata. Sometimes, it is useful to edit metadata in bulk after recording and before sending the files to post-production.

System

The 688 SYSTEM sub-menu allows for setup and control of various key system settings, such as tone or bell levels, date and time parameters, meter ballistics and more.

This sub-menu also provides access to viewing product version information and conducting firmware updates.

Some System settings, such as those related to headphones, Meter Views, or the LCD, are described in more detail in others sections of this guide where applicable. This section provides information for System settings not already covered elsewhere.

Topics in this section include:

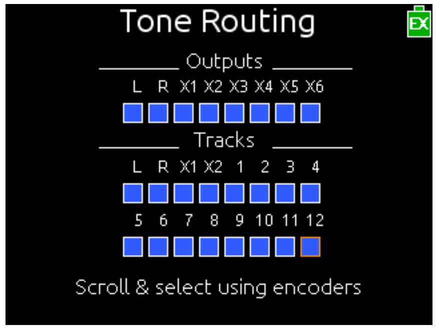
Setting up Tones and Bells

The 688's internal tone oscillator, used for sending tone to outputs and tracks, has several settings to accommodate different workflows.

Activating tone is explained in more detail in the Outputs section of this guide.

To define tone settings:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM.
3. Configure the tone oscillator by modifying the following parameters.

Parameter	Description	Options
Tone Routing	Displays the Tone Routing screen where the tone signal can be routed to any output or track.  By default, all outputs and tracks are selected.	• Outputs: L, R, and X1-X6 • Tracks: L, R, X1, X2, and tracks 1-12
Tone Level	Sets the level of the internal tone generator. By default, this level is set to 0 dBu.	• 0-20 dBu (1 dBu increment)
Tone Frequency	Sets the audio frequency of the internal tone generator. By default, this frequency is set to 1000 Hz.	• 100-10000 Hz (10 Hz increment)
Tone Action	• Sets the action for when the MIC/TONE switch is slid to the right. By default, this action is set to send a continuous tone. • Sets secondary action for when the SELECT encoder is pressed and held as the MIC/TONE switch is slid to the right. By default, this action is set to L Ident. • The No Action option is used to prevent accidental activation of the tone oscillator.	• No Action • Continuous • L Ident

Configuring Record/Stop and Warning Bells

The start of a recording is indicated audibly by a single 440 Hz tone sent to the sound mixer's headphones. When recording is stopped two 220 Hz tones are sent. These audible alerts are called the Record/Stop and Warning bells.

Warning bells alert users with an audible tone when the mixer has encountered an error, such as low power.

The default decibel level for these bells is -30 dBFS, but that level may be changed in 1 dB increments from -60 to -12 dbFS, or turned off entirely.

To set warning bell levels:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Warning Bell Level.
3. Turn and press the Headphone encoder to set a new level. Options include: Off, -60 to -12 dbFS in 1 dB increments.

By default, the Record/Stop bells are turned on, but they may be turned off.

ⓘ *Disabling does not apply to Warning bells.*

To turn on or off the Record/Stop bells:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Record/Stop Bell.
3. Turn and press the Headphone encoder to enable or disable the bell. Options include: On or Off.

Configuring the Meters

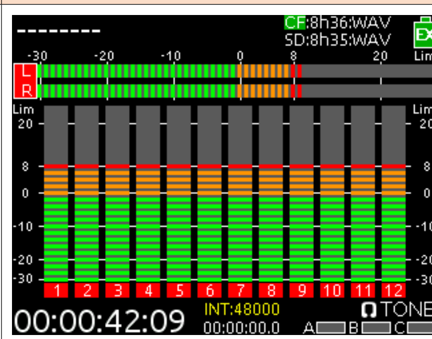
The meters displayed in Meter Views are configurable. For instance, the meters can be displayed as segmented or solid bars.

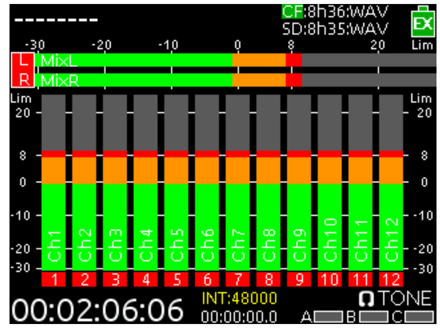
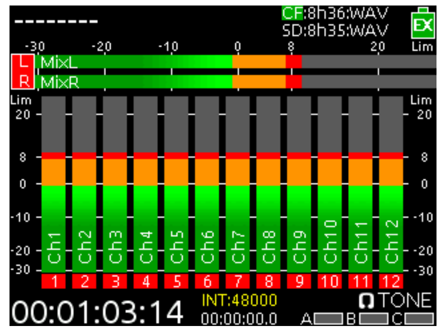
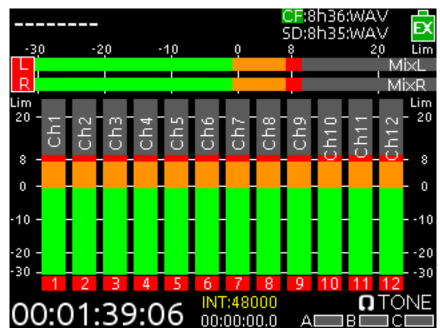
Additionally, the track names may be displayed to help identify the tracks in Meter Views.

To configure the meters:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Meter Display Style.
   - To display segmented meters, set the style to Segmented.
   - To display meters as solid bars, set the style to Solid.
3. Turn and press the Headphone encoder to select SYSTEM > Track Names in Meters.

   Options include:

OPTION	DESCRIPTION	EXAMPLE
Off	Turns off the display of track names in meters. ⓘ *The example shows segmented meters.*	

Option	Description	Example
Bottom	Positions track names on the lower end of the meter scale. ⓘ *The example shows solid meters.*	
Bottom w/ramp	Applies a gradient to the background color, and positions track names on the lower end of the meter scale.	
Top	Positions track names on the higher end of the meter scale.	

Setting Meter Ballistics and Peak Hold

Audio meter ballistics is the manner in which a visual meter responds to audio signal levels. The ballistics for all meters is globally set for the mixer via System settings.

To configure meter ballistics:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Meter Ballistics.

   Options include:

Options	Description
VU Only	Volume Units (VU) meter ballistics correspond closely to how the human ear perceives loudness. This provides a good visual indication of how loud a signal will be. In VU mode, the attack and decay of the meter signal is 300 mS. VU meters provide good visual indication of how loud a signal will be, but provide poor information of actual signal peaks.

Options	Description
Peak + VU	In Peak + VU mode, the perceived loudness (or VU) is simultaneously displayed as a standard bar while the peak signal is displayed as a single, independent segment above the VU.
Peak Only	Peak-reading ballistics (PPM) correspond to actual signal peaks, but do not necessarily correspond to perceived signal loudness. Peak meters have an instantaneous attack and a slow decay to allow visual monitoring of peak activity. Peak metering is useful in digital audio workflows. In the digital realm, signal overload can cause immediate distortion.

Setting Peak Hold

When meter ballistics is set to Peak + VU or Peak Only, peak hold displays the last highest peak value on the meter as a separate, individual meter segment. By default, this meter segment will remain visible for 1 second. This time frame is called the Peak Hold, and it may be adjusted or disabled altogether.

To modify the Peak Hold time for meters:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Meter Peak Hold Time.

   Options include:

Options	Description
1 - 5 sec	Sets the Peak Hold time to display the highest peak value for the selected time, from 1 to 5 seconds.
Infinity	Sets the Peak Hold time to display the last highest peak value indefinitely until a higher peak is reached.
Off	Does not hold peak values.

Setting up Date and Time Parameters

Properly setting the time and date is important for file metadata, file system functioning, and some timecode functions. Setting the correct GMT time zone and daylight savings values is also vital for correct data stamping on the exFAT file system.

The 688 has several System settings related to date and time parameters:

Parameter	Description	Options
Time Format	Sets the format used for times displayed by the mixer. By default the format is set to 12 hours.	• 12hr • 24hr
Date Format	Sets the format used to indicate the date, used in metadata. By default, the format is set to two-digit increments for month/day/year (mm/dd/yy).	• mm/dd/yy • dd/mm/yy • yy/mm/dd
Set Time/Date	Displays the Set Time/Date screen used to set the time and date.	

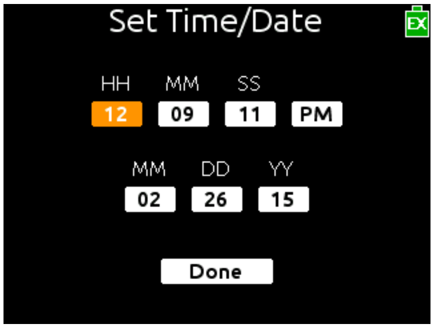
Parameter	Description	Options
Time Zone	Sets the time zone, based on Greenwich Mean Time (GMT).	• GMT-1:00 – -12.00 • GMT • GMT+1:00 – +13:00
Daylight Savings Time	Sets whether or not daylight savings is in effect. By default, daylight savings is off.	• On • Off

To set the formats for time and date:

1. Press the MENU button.
2. Do one of the following:
   - ▶ Turn and press the Headphone encoder to select SYSTEM > Time Format.
   - ▶ Turn and press the Headphone encoder to select SYSTEM > Date Format.
3. Turn and press the encoder to select a format option.
   - ◦ Time Format options include: 12hr or 24hr.
   - ◦ Date Format options include: mm/dd/yy, dd/mm/yy, or yy/mm/dd.

To set the time and date:

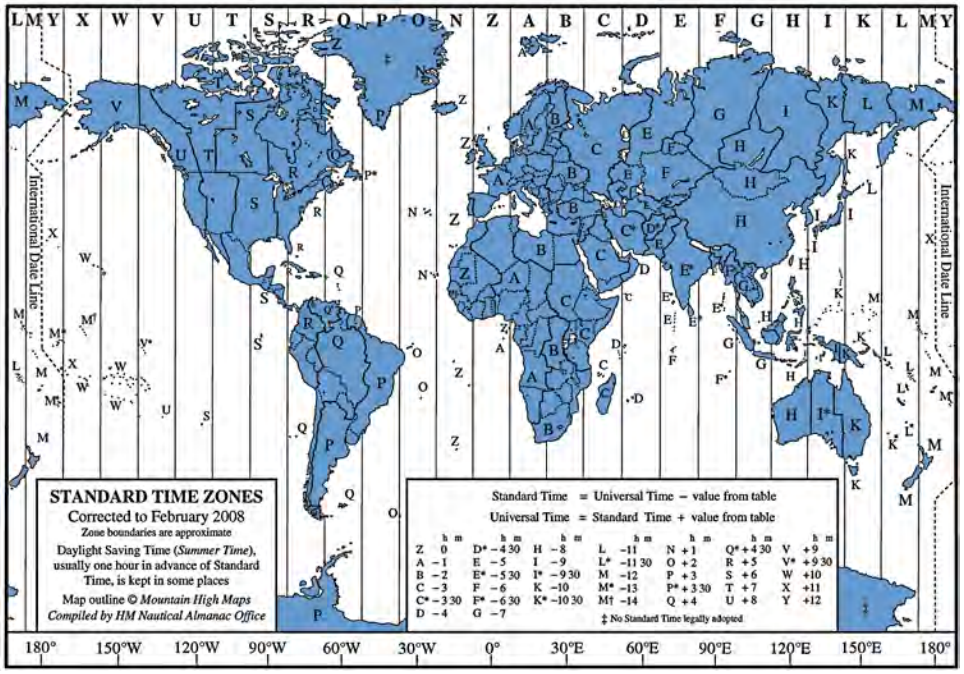
1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Set Time/Date.
3. Turn the encoder to move the highlight to each of the time and date fields.



4. Press the encoder to select a field.
5. Turn the encoder to change the value of each selected field.
6. When finished modifying the time and date fields, turn and press the encoder to select Done.

To select the time zone:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Time Zone.
3. Turn and press the encoder to select the proper GMT time zone for your location.



To enable or disable Daylight Saving Time:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Daylight Saving Time.
3. Do one of the following:
   - ▶ To enable, turn and press the encoder to select On.
   - ▶ To disable, turn and press the encoder to select Off.

Calibrating Faders & Pans

The 688 Faders and Pan pots come pre-calibrated to center. However, should they ever need to be recalibrated, that can be done via a System settings sub-menu option.

To calibrate faders and pans:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Fader/Pan Calibration.
3. Ensure all front panel controls are turned to the 12 o’clock position.
4. Press the Headphone encoder to select OK.

   A “Calibration Successful” message appears when calibration is complete.

ⓘ *To cancel without calibrating, press the MENU button or use the Headphone encoder to select Cancel.*

Using a USB Keyboard

By default, the SYSTEM > USB Port sub-menu is set to Keyboard.

ⓘ *The alternative option is Factory Test, which is a setting reserved for the purposes of in-house quality assurance testing.*

Included with the 688 is a USB 2.0 A (Female to Female) connector and a USB A to B cable, which may be used to connect a standard USB keyboard to the 688 mixer.

To use a USB keyboard with the 688:

1. Connect the keyboard’s male USB A plug into the supplied USB A female adapter.
2. Connect the the other end of the adapter to the USB A to B cable.
3. Plug the other end of the cable into the USB-B jack on the mixer’s right panel.

Keyboard shortcuts are provided in the Shortcuts section of this guide.

Viewing Shortcut Information

While this guide provides a section on the various shortcuts available with the 688, there is also an abbreviated list provided as a quick reference on the mixer itself.

To view shortcut information:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Shortcut Info.
3. Turn the encoder to scroll down the list.
4. Press the encoder to select OK and exit the list.

Viewing Version Information

Information regarding the product’s serial number, software and timecode versions, plus build numbers is provided on the mixer via a System settings sub-menu option.

To view version information:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select SYSTEM > Version Info.

Updating Firmware

Periodically, Sound Devices releases firmware updates to improve system performance and expand the 688 feature set, which may be downloaded from the website and used to update the firmware on the mixer.

To update firmware:

1. Download the firmware from the Sound Devices website to your computer.
2. Extract the ZIP file, which will contain a folder with a .prg file and related documentation.
3. Copy this .prg file to the root level of an approved SD or CF memory card. Do not place the file in any folder.

ⓘ *Be sure to use a memory card already formatted in the mixer.*

4. Insert the SD or CF card with the .prg file.
5. Power on the mixer if not already on.

ⓘ *Power the mixer from an external DC power source. Do not perform firmware updates with low batteries or unstable power sources.*

6. Press the MENU button.
7. Turn and press the Headphone encoder to select SYSTEM > Update Firmware.
8. Follow the on-screen instructions.
9. After the update is complete, the mixer power cycles.

   When it reboots, the updated version number will appear briefly on the splash screen, and the mixer displays a message confirming the firmware update.

Quick Setup

The 688 helps improve work-flow efficiency by providing users a way to save and load various custom configurations as Quick Setup XML files.

These Quick Setup files retain all settings made in the Main menu as well as adjustments made to all inputs (including routing) via the Input Settings screens.

Four configurations may be saved directly to the mixer; others may be saved to memory cards for use later.

Topics in this section include:

Saving Settings

After you have configured the 688's settings via the Main menu and Input Settings screens, you can save the configuration as a Quick Setup file.

To save settings as a Quick Setup file:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select QUICK SETUP.
3. Select where you want to save your settings. Options include:

OPTION	DESCRIPTION
INT1 - INT4	Select one of the Save Settings to INT (1-4) options to store your configuration locally on the mixer. There are four internal (INT) locations. Each will hold one Quick Setup file. ⓘ *New settings stored to an INT location will overwrite any Quick Setup file previously stored there.*
CF	Select Save Settings to CF to store your configuration on any CompactFlash memory card inserted into the 688.
SD	Select Save Settings to SD to store your configuration on any Secure Digital memory card inserted into the 688. ⓘ *Saving to a CF or SD card will create a folder named SETTINGS, if it does not already exist.*

4. Name your Quick Setup file.

ⓘ *When saving to CF or SD cards, if a file with the entered name already exists, that previous file will be overwritten by the new file you save.*

5. Slide the RTN/FAV switch to select OK and save your Quick Setup file.

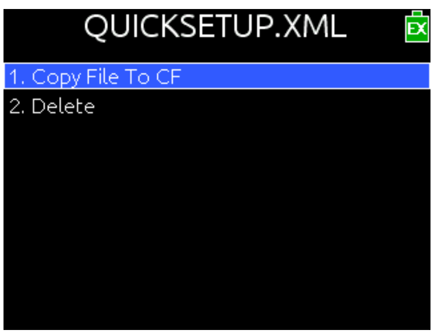
   All Quick Setup files are saved as XML files.

Copying Quick Setup Files

Quick Setup files saved on one memory card may be copied to another memory card as an additional backup.

To copy files from one memory card to another:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > File List.
3. Select the memory card with the file you want to copy.
4. Select the SETTINGS folder on that card.
5. Select the Quick Setup XML file you want to copy.
6. Slide the RTN/FAV switch to access OPTION.



7. Select the Copy File ... option. The name of this option will vary depending on whether you are copying to a CF card or an SD card.

Deleting Quick Setup Files

Saving a new configuration to any of the internal (INT) locations will overwrite the previously saved file. The same applies to files saved to CF or SD cards so long as the file names match.

However, if you want to delete a file from a CF or SD card, you can do that without replacing it with a file of the same name.

To delete a file from a memory card:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select FILE STORAGE > File List.

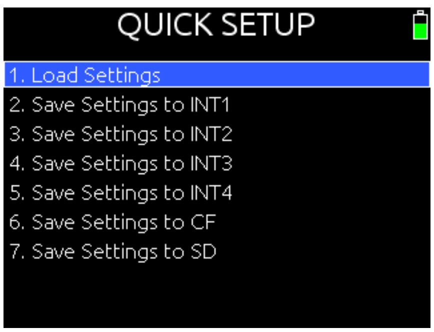
3. Select the memory card with the file you want to delete.
4. Select the SETTINGS folder on that card.
5. Select the Quick Setup XML file you want to delete.
6. Slide the RTN/FAV switch to access OPTION.
7. Select Delete.

Loading Previously Saved Settings

For fast reconfiguring of the 688, previously stored Quick Setup files may be easily loaded from internal locations or memory cards inserted into the mixer.

To load a Quick Setup file:

1. Press the MENU button.
2. Turn and press the Headphone encoder to select QUICK SETUP > Load Settings.



3. Select the file you want to load from the provided list.

ⓘ *The first option in the list reloads the Factory Default settings. Selecting this option restores all settings on the mixer to original factory defaults.*

Shortcuts

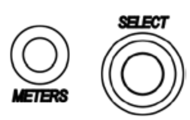
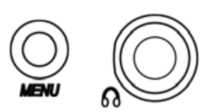
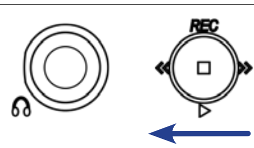
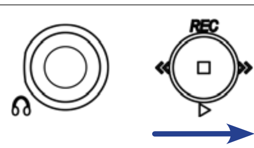
The 688 features numerous shortcuts to help speed navigation.

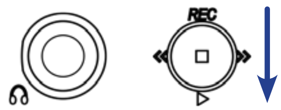
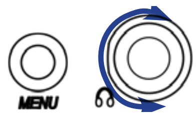
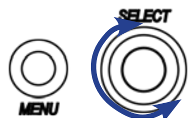
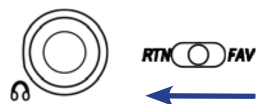
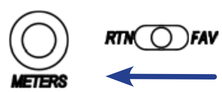
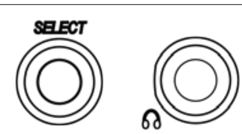
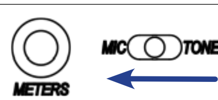
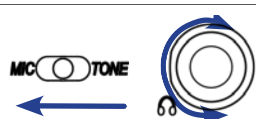
The shortcuts require either simultaneously pressing combinations of front panel controls or using keystroke combinations when a USB keyboard is attached to the mixer.

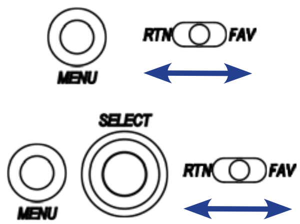
Topics in this section include:

- **Front Panel Shortcuts**
- **USB Keyboard Shortcuts**

Front Panel Shortcuts

FUNCTION	SEQUENCE	ACTION
Arm/Disarm Track		METERS + SELECT: Press and hold METERS down then press the Select encoder. This toggles the armed status of the highlighted track on the Main screen.
File/Take List		MENU + HP: Press and hold MENU down then press the Headphone encoder. This displays the Take List screen.
False Take		HP + << (Rewind): Press and hold down the Headphone encoder then push the Transport control to the left. This moves the previous recorded file(s) to the False Takes folder and decrements the Take number.
Scene Increment		HP + >> (Fast Forward): Press and hold down the Headphone encoder then push the Transport control to the right. This increments the scene name according to the Scene Increment Mode setting.

Function	Sequence	Action
Toggle Playback Card		HP + Play: Press and hold down the Headphone encoder then push the Transport control downward (Play). This toggles the playback media card between SD or CF. Target media is indicated by a green background on the Main screen.
LED Brightness		MENU + HP turn: Press and hold MENU down then turn the Headphone encoder. This adjusts the brightness of all LEDs.
LCD Brightness		MENU + SELECT turn: Press and hold MENU down then turn the Select encoder. This adjusts the back-light level of the LCD.
Scene Name		HP + RTN: Press and hold down the Headphone encoder then push the RTN/FAV switch to the left. This enables editing of the scene name. When used during recording, the current scene name is edited. During standby, when not recording, the next scene name is edited.
Current Take Phrase		HP + FAV: Press and hold down the Headphone encoder then push the RTN/FAV switch to the right. This accesses the phrase list and applies the selected phrase to the last take recorded (during standby) or to the currently recording take (during recording).
Toggle Sample/Frame Rate Display		METERS + RTN: Press and hold METERS then slide the RTN/FAV switch to the left. This toggles the display of timecode frame rate information and audio sample rate information.
Toggle Daylight Mode		SELECT + HP: Press and hold down Select encoder then press Headphone encoder. This toggles the LCD display between Standard and Daylight modes.
Jam Menu		METERS + MIC: Press and hold METERS then slide the MIC/TONE switch to the left. This accesses the TC Jam menu.
Slate Mic Gain		MIC + HP turn: Slide and hold the MIC/TONE switch to the left then turn the Headphone encoder. This adjusts the slate mic gain.

Function	Sequence	Action
RTN Loopback Mode		MENU + RTN/FAV or MENU + SELECT + RTN/FAV: This accesses Loopback Mode for the configured returns (A, B, or C). The actions of these shortcut combinations might vary because the RTN/FAV switch action may be modified via the Main menu's COMMS/RETURNS settings. For example, if the RTN switch (left) action is set to RTN A and the alternate combination action of SELECT + RTN switch (left) is set to RTN B, then pressing MENU + sliding the switch left will access Loopback Mode for RTN A. Likewise, pressing MENU + SELECT + sliding the switch left will access Loopback Mode for RTN B. This shortcut variable also applies to FAV switch (right) actions.

USB Keyboard Shortcuts

A standard USB keyboard connects to the 688 to ease navigation and data entry. Attach the keyboard to the 688 USB port using a USB A to USB A adapter (included). Anytime the QWERTY pop up keyboard is displayed, the USB keyboard can be used to enter data.

Additionally, the following shortcuts are available.

ⓘ *Keyboards with an embedded USB hub are not compatible. Apple brand keyboards are not compatible. Some keyboards must be connected only after the mixer is turned on.*

Keystrokes	Action
F1 or Menu key	Accesses the Main menu.
F2	Accesses the Take List.
F3	Cycles between available Meters views and the Main screen.
Ctrl + R	Record.
Ctrl + S	Stop.
Spacebar	Play.
Left Arrow	Main screen: Rewind. Input Settings screen: Toggle phase inversion.
Right Arrow	Main screen: Fast forward. Input Settings screen: Toggle LR Mix assignment.
Up / Down Arrows	Main screen: Adjusts headphone volume. In menus: Moves highlight. While editing parameters: Changes the value.
Enter	Main screen: Accesses the HP Monitor Source list. In menus: Activates current selection. (Same as encoder press.)

Keystrokes	Action
Alt + Enter	Main screen: Toggles arming of selected track.
Ctrl + Enter	Access gain adjustment for highlighted L, R, X1, X2, X3, X4, X5, X6, or RTN track.
Ctrl + Up/Down Arrows	Main screen: Select tracks. Input Settings screen: Adjusts trim gain for inputs 7-12.
Ctrl + Left Arrow	Input Settings screen: Change X1 assignment.
Ctrl + Right Arrow	Input Settings screen: Change X2 assignment.

Specifications

Various product specifications for the 688 are provided here for your convenience. They relate to inputs and outputs, powering, environmental parameters, as well as physical aspects of the mixer.

Specifications are subject to change without prior notice.

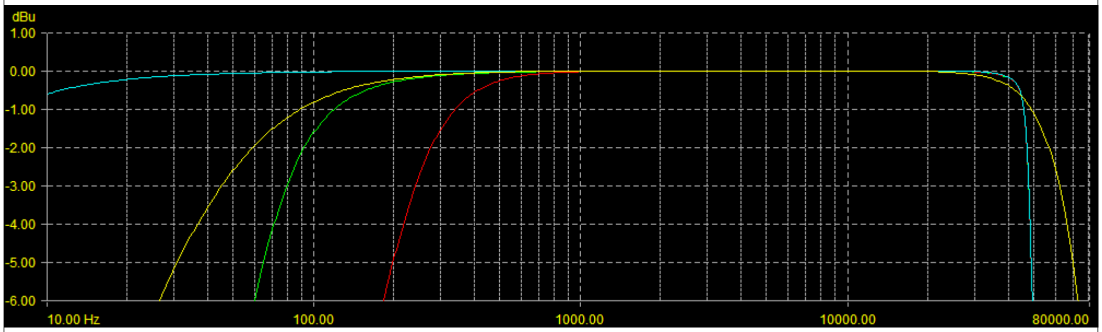
For the latest information available on all Sound Devices products, visit our website at: www.sounddevices.com.

Topics in this section include:

- Analog Inputs
- Digital Inputs
- Analog Outputs
- Digital Outputs/Recorder
- Timecode and Sync
- Power
- Environmental
- Dimensions and Weight

Analog Inputs

Frequency Response	· 10 Hz to 40 kHz ± 0.5 dB, -3dB @ 65 kHz (192 kHz sample rate, re 1 kHz)
THD + Noise	· 0.09% max (1 kHz, 22 Hz–22 kHz BW, fader at 0, 0 dBu output)
Equivalent Input Noise	· -126 dBu (-128 dBV) maximum. (22 Hz - 22 kHz bandwidth, flat filter, trim control fully up)
Inputs	· XLR Mic: Active-balanced for use with ≤600 ohm mics, 4k ohm actual; 12V or 48V phantom power, 10 mA max · XLR AES: AES3 or AES 42 (10V power), Sample Rate Converted · XLR Line: Active-balanced for use with ≤2k ohm outputs, 10k ohm actual · TA3 Line: Active-balanced for use with ≤2k ohm outputs, 10k ohm actual · RTN A, B, C (3.5 mm/10-pin): Unbalanced stereo for use with ≤2k ohm outputs, 6.5k ohm actual · Slate Mic (TA3): 6.5k ohms
Input Clipping Level	· 0 dBu minimum (trim control fully down)
Maximum Input Level	· XLR-3F Mic: 0 dBu (0.78 Vrms) · XLR-3F Line: +40 dBu (80 Vrms) · RTN A, B, C (3.5 mm/10-pin): +24 dBu (12.4 Vrms)
Pre-Fader Input Limiters (Inputs 1-6)	· +16 dBu threshold (fixed), soft knee/hard knee · 20:1 limiting ratio · 1 mS attack time · 500 mS release time
Post-Fader Input Limiters (Inputs 1-12)	· Adjustable threshold +4 dBu to +18 dBu · 20:1 limiting ratio · 1 mS attack time · 500 mS release time

High-Pass Filters	Adjustable 80 Hz to 240 Hz, 18 dB/oct at 80 Hz (Up to 96 kHz SR) Fixed 50Hz, 6 dB/octave (192 kHz SR)  · Blue: 96K full response · Green: 96K 80 Hz · Yellow: 50 hz 192K · Red: 96K 240 Hz
Microphone Powering (each analog Input select-able)	· 12 V Phantom: through 680 ohm resistors, 10 mA per mic available · 48 V Phantom: through 6.8k resistors, 10 mA per mic available

Digital Inputs

AES3	· Balanced: 110 ohm
AES42	· AES42 Mode 1, provides +10 V Digital Phantom Power
Post-Fader Digital Limiters	· +4 dBu to +18 dBu threshold (adjustable) · 20:1 limiting ratio · 1 mS attack time · 500 mS release time

Analog Outputs

Outputs	· Line (XLR and 10-pin): transformer-balanced, 120 ohms · -10 (XLR and 10-pin): transformer-balanced, 3.2k ohm · Mic (XLR and 10-pin): transformer-balanced, 150 ohms · TA3 (X1-X4) Mic/Line/-10: active-balanced, 240/3.2k/120 ohms · TA3 (X5/X6) -10: unbalanced, 100 ohms · Tape Out (3.5 mm): unbalanced, stereo, 1.8k ohms · Headphones (3.5 mm and 1/4"): unbalanced, stereo, 60 ohms
Maximum Gain	· Mic-In to L/R/X1/X2/X3/X4 (Line): 91 dB · Mic-In to L/R/X1/X2/X3/X4 (-10): 77 dB · Mic-In to X5/X6 (-10): 74 dB · Mic-In to L/R/X1/X2/X3/X4 (Mic): 51 dB
Headphone Max. Gain	· 63 dB (Line 1-6 Input) · 44 dB (Line 7-12 Input) · 103 dB (Mic Input)
Line Output Clipping Level (1% THD)	· 20 dBu minimum with 10k load

Output Limiters	· L/R and X1/X2, adjustable threshold from +4 dBu to +18 dBu, soft knee/hard knee · 20:1 limiting ratio · 1 mS attack time · 500 mS release time

Digital Outputs/Recorder

AES3 Output:	· AES Out 1-4 on XLR-3M connectors · AES Out 5-8 on Hirose 10-pin connectors · 110 ohm, 2 V p-p, AES and S/PDIF compatible with RCA adapter
Sampling Frequency	· 44.1 kHz · 47.952 kHz · 48 kHz · 48.048 kHz · 88.2 kHz · 96 kHz · 192 kHz
A/D	· 24 bit
A/D Dynamic Range	· 114 dB, A-weighted, typical
Input Delay	· Adjustable 0-30 mS for each input in 0.1 mS steps
Output Delay	· Adjustable 0-417 mS (0-12.5 frames @ 30 fps) for each output in 1 mS steps
Media Type	· Secure Digital Extended Capacity (SDXC) · Secure Digital High Capacity (SDHC) · Secure Digital (SD) · CompactFlash (CF) · FAT32 formatted (<32GB), exFAT for (>32GB), on-board memory card formatting
File Type	· Record: WAV (Broadcast Wave File format), polyphonic or MP3 · Playback: WAV (Broadcast Wave File format), polyphonic or MP3
Sampling Clock Accuracy	· ± 0.2ppm

Timecode and Sync

Modes Supported	· Off · Rec Run · Free Run · 24h Run · External
Frame Rates	· 23.976 · 24 · 25 · 29.97DF · 29.97ND · 30DF · 30ND
Accuracy	· Ambient Generator: ±0.2ppm (0.5 frames per 24 hours) · Holds TC clock for two hours after main battery removal
Timecode Input	· 20k ohm impedance · 0.3 V - 3.0 V p-p (–17 dBu - +3 dBu)
Timecode Output	· Output: 1k ohm impedance · 3.0V p-p (+12 dBu)

Wordclock	· In/Out: Square wave; 10k/75 ohm, 1-5 V p-p input; 75 ohm, 5V p-p output, at SR · Termination: 75 ohm, Off

Power

External Power Supply	· 10-18 V on locking 4-pin Hirose connector, pin-4 = (+), pin-1 = (-) · Mates with gold Hirose #HR10A-7P-4P (DigiKey# HR110-ND) or silver Hirose #HR10-7P-4P (DigiKey# HR100-ND) locking connector
Internal Power Supply	· Accepts 5 AA-sized (LR6) batteries, nominal (NiMH rechargeable recommended)
PowerSafe	· 10 second power reserve
Idle Current Draw	· 680mA at 12V (8.16W) - Inputs 1-6 powered on, SD and CF inserted

Environmental

Operation and Storage	· Operating: -20°C to 60°C · Storage: -40°C to 85°C · 0 to 90% relative humidity (non-condensing)

Dimensions and Weight

Size (H x W x D)	· 5.3 cm x 32 cm x 19.8 cm · 2.1 in. x 12.7 in. x 5.6 in.
Weight	· 4 lbs. 14 oz. (unpackaged, without batteries) · 2.21 kg (unpackaged, without batteries)

Accessories

The 688 works with various accessories which may be purchased separately and used to further enhance your field mixing and recording experience.

This section is not intended to be an all-inclusive list of accessories available for use with the 688.

For the latest information available on all Sound Devices products and their accessories, visit our website at:

www.sounddevices.com

Topics in this section include:

Electronic Accessories

Accessory	Photo	Description
SL-6		This optional powering and wireless system simplifies interconnection and provides better control, display and navigation of the user interface for SuperSlot™-compatible wireless receivers. It also provides a antenna distribution, USB charging port, two 12 V isolated outputs, and two non-isolated direct battery outputs for powering additional devices, along with PowerSafe for the receivers. (Wireless receivers are not included.)
CL-6		This optional input controller attaches to the bottom of the 688 and adds six full-sized tactile fader controls, sunlight-viewable LED metering and big, back-lit Record and Stop controls. When the CL-6 is attached to a 688, the 688's mini-faders, originally assigned as faders for 7-12, switch to control trim levels of 7-12, and the CL-6 faders control fader levels of 7-12.

Cases

Accessory	Photo	Description
CS-664		This production case, designed by CamRade for Sound Devices, may be used for either the 688 or 664 and one attached accessory, such as the SL-6 or CL-6 (pictured here with the 688). Case has a detachable accessory compartment and a battery compartment for NP-type batteries on the bottom. (Strap sold separately.)
CS-Strap		This medium-duty neck strap with metal hooks was designed by PortaBrace for use with various Sound Devices production cases.

Cables and Connectors

Accessory	Photo	Description
XL-1B		A 12-inch TA3-F to TA3-F cable, used to connect TA3 auxiliary outputs to TA3 inputs of receiving devices and TA3 outputs of sending devices to TA3 inputs.
XL-2		A 25-inch TA3-F to XLR-3M cable, used to connect the TA3 auxiliary outputs to third-party devices with XLR-3F inputs. Each package contains two cables.
XL-2F		A 25-inch XLR-3F to TA3-F cable, used to connect mixers and other devices with XLR-3M outputs to the TA3 7-12 inputs on the 688. Also used to attach standard microphone as auxiliary slate mic. Each package contains two cables.

Accessory	Photo	Description
XL-3		A 12-inch, 3.5mm to TA3F link cable.
XL-4		Bag of four (4) TA3-F-type connectors.
XL-7		A 12-inch cable to connect unbalanced, stereo TA3 X5/X6 connection to unbalanced stereo 3.5-mm inputs.
XL-10		Hirose 10-pin to two-XLR (balanced L/R) and 3.5 mm plug (stereo return A and C) breakout cable; includes in-line 20-foot extension cable. The XL-10 is a high-quality multi-pin breakout and extension cable designed specifically for Sound Devices field production mixers. It provides easy access to the balanced outputs and stereo return A and C connections.
XL-H		Bare Hirose 4-pin locking DC connector (HR10-7P-4P).
XL-NPH		An NP-type battery cup with 24-inch cable terminated in Hirose 4-pin locking DC connector (HR10-7P-4P).

Accessory	Photo	Description
XL-LB2		A 75 ohm, LEMO®-5 to BNC input and BNC output cable for timecode jamming of audio and video equipment with BNC connectors, for SMTPE time-code.
XL-LL		LEMO-5 to LEMO-5 coiled cable for timecode inter-connection between the 688 and other devices.
XL-LX		LEMO-5 to XLR-3F input and XLR-3M output for timecode interconnection between the 688 and other devices.
XL-WPH3		The XL-WPH3 is an AC-to-DC (in-line) 100-240V power supply unit with 50/60 Hz input, a 12 VDC 3.75 A (45 W) output, and a Hirose 4-pin DC plug. It comes supplied with a 3-pin IEC cord.

Software

Accessory	Photo	Description
Wave Agent		Sound Devices Wave Agent, a file librarian for computers, provides a comprehensive range of tools for preparing audio files for problem-free passage through complex production workflows. For more a free download, visit: www.waveagent.com

CL-6 Controller

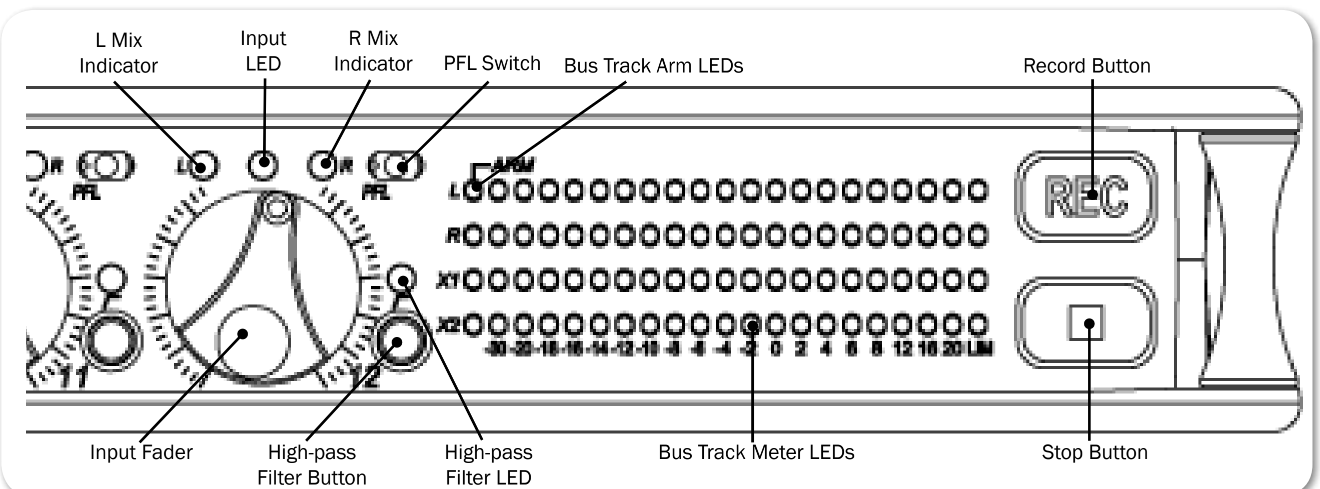
The CL-6 Controller is an optional, input-expansion accessory available for use with Sound Devices 688 or 664.

It adds dedicated front panel controls, including six full-sized fader controls for inputs 7 through 12 and PFL control, high-pass filter control. Other features include large, daylight viewable LED track meters with track arm indicators for tracks L, R, X1 and X2, plus additional recording controls.

Topics in this section include:

Front Panel

The front panel has the following features.



Feature	Description
Input Fader	Primary control for adjusting the fader levels of inputs 7-12 during operation. Ranges from off to +16 dB. Nominal setting is in the middle (0 dB).
High-pass Filter Button	Push to toggle activation of high-pass filter per channel.
High-pass Filter LED	Illuminates blue to indicate high-pass filter is engaged per channel.

Feature	Description
L Mix Indicator	Illuminates blue when the input has been routed track L.
Input LED	Indicates input signal activity. Illuminates in various colors and intensities to show signal level and activity. • Green = signal presence (pre-fader) • Yellow = limiter activity (pre- and post-fade) • Red = signal overload/clipping (pre- and post-fade) • Flashing yellow = input PFL (solo)
R Mix Indicator	Illuminates blue when the input has been routed right bus.
PFL Switch	Activates PFL (slide left) and displays Input Settings screen (slide right) for respective inputs 7-12.
Bus Track Arm LEDs	Illuminates red to indicate the track is armed for recording.
LED Bus Track Meters	Displays metering levels for L, R, X1, and X2 tracks.
Record Button	The Transport Control on the mixer operates normally when the CL-6 is attached. This alternate, backlit Record button provides an additional control point for starting a recording.
Stop Button	This alternate, backlit Stop button provides an additional control point for stopping a recording.

Attaching the CL-6

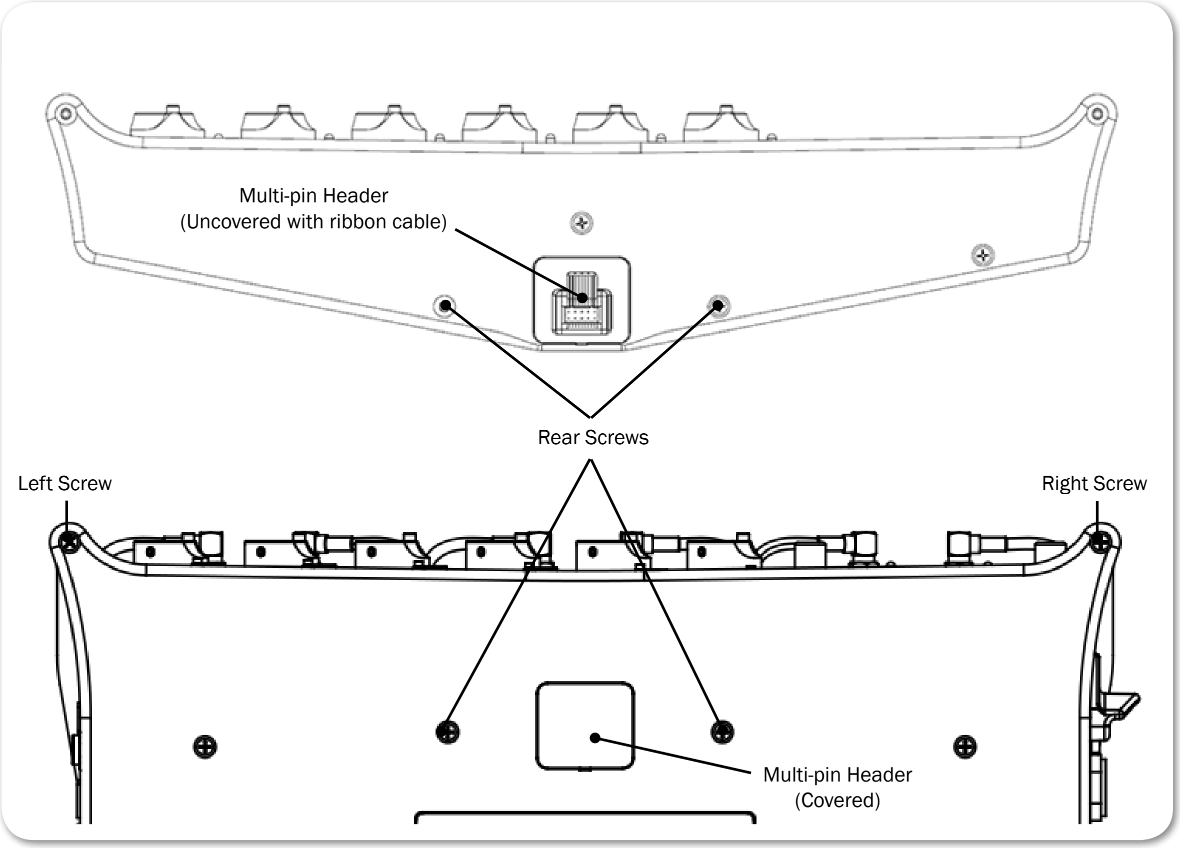
The CL-6 was designed to mount on the 688 and 664 field mixers. The CL-6 attaches with screws to the bottom panel of the 688 field production mixer. When used with a 664, the CL-6 may be attached to either the top or bottom panel.

Regardless of a top or bottom mount, the process for attaching the CL-6 remains the same.

To attach the CL-6:

1. Turn the mixer off. Do not connect the CL-6 with mixer on.
2. Remove the disposable protective covers over the multi-pin headers from the mixer and the CL-6, using a small, flat tool. (A jeweler’s screwdriver works well.) The protective covers are attached with adhesive.
3. Remove only one of the rear screws from the CL-6. The rear screws are located on either side of the multi-pin header. Either screw may be removed, but do not remove both.
4. Remove the rear screw on the mixer that corresponds with the one removed from the CL-6.
5. Remove the left and right screws from the mixer.

ⓘ *The screws removed in previous steps will not be reused with the new assembly. However, these screws should be kept if you should decided to operate the mixer without the CL-6 in the future.*



6. Connect the supplied ribbon cable to the multi-pin header on the mixer.
7. Carefully slide the rubber gasket into place where the ribbon cable connects to the mixer.
8. With the mixer positioned on a flat, stable surface, hold the CL-6 in hand, and connect the other end of the ribbon cable to the CL-6.
9. Insert the excess ribbon cable into the cavity behind the header on the CL-6 while lowering the CL-6 into position. Ensure the ribbon cable is fully within the cavity and not pinched between the accessory and mixer.
10. Using a screwdriver, drive the 3 longer screws (supplied) through the CL-6 and into the mixer—one in place of the removed rear screw and two others in place of the removed right and left screws.

After the CL-6 is connected, inputs 7 through 12 have dedicated fader controls, PFL switches and LEDs to indicate various input signal and track activity. The CL-6 LED meters show L, R, X1, and X2 metering activity.

Additional buttons are also available for starting or stopping recordings and toggling the high-pass filter from on at 150 Hz to off.

Trim Levels (688 only)

When the CL-6 is attached to the 688, the mini-faders on the 688 become dedicated trim controls for inputs 7-12.

To adjust the trim level for inputs 7-12:

▶ Turn the appropriate mini-fader on the 688. The trim gain will be displayed on the mixer's LCD.

Trim Levels (664 only)

When the CL-6 is attached to the 664, the mixer's SELECT encoder may be used to adjust trim for inputs 7-12.

To adjust the trim level for inputs 7-12:

1. Slide the input's PFL switch on the CL-6 to the right to access the Input Settings screen on the mixer's LCD.
2. Turn the SELECT encoder to adjust trim for the input. The trim gain will be displayed on the mixer's LCD.

Using High-pass Filters

The High-pass Filter button on the CL-6 is a toggle, which turns the high-pass filter off or on to a predefined setting of 150 Hz.

ⓘ *On the 688, the high-pass filter may be adjusted to other frequencies via the Input settings; however, if the button on the CL-6 is used, high-pass filtering is turned on at a set frequency of 150 Hz.*

To turn on or off high-pass filter:

▶ Press the High-pass Filter button.

The High-pass Filter LED illuminates when high-pass filtering is on.

CS-664

Production Case for 664 or 688

Manufactured by CamRade for Sound Devices, this production case was designed for use with the 664 Field Production Mixer or the 688 Portable Mixer/Recorder, as well as the CL-6 input expansion controller or the SL-6 wireless receiver pack.

The case accommodates NP type battery and includes doors to access back panel connections.

Included:

- CS-664 Production Case
- Detachable Wireless Bag
- High-quality Shoulder Strap

Features

The production case is made from durable nylon, padded with internal reinforcements for shock resistance, durability, and temperature insulation.

Other features include:

- Detachable accessory compartment for wireless transmitters, receivers, recorders, or mixers
- Divider/compartment insert for use with 664 or 688 without attached accessory, such as the CL-6 or SL-6
- Battery compartment holds an NP-type battery below the unit
- Quick trap door access to back panel.
- Adjustable length, comfortable padded leather strap
- Properly balanced with or without an NP-type battery
- Loop mounts for attaching third-party wireless cases or to combine with Sound Devices CS-W
- Includes removable windowed cover with side access
- Covers can be rolled back and held with hook and loop fastener

Sound Devices, LLC
E7556 Road 23 and 33
Reedsburg, Wisconsin USA

+1 (608) 524-0625
Fax: +1 (608) 524-0655

Customer Support

Toll Free: (800) 505-0625

support@sounddevices.com
http://www.sounddevices.com/support
http://forum.sounddevices.com

Product Information

For more information about products and accessories, visit us on the web at www.sounddevices.com